

United States Environmental Protection Agency
Region 4
Science and Ecosystem Support Division
Enforcement and Investigations Branch
980 College Station Road
Athens, Georgia 30605-2720



Compliance Sampling Inspection Report
Hattiesburg South Wastewater Treatment Plant
NPDES Permit MS0020303
1903 East Hardy Street
Hattiesburg, Mississippi 39401

SESD Project ID: 11-0591
Inspection Date: July 25 – 29, 2011

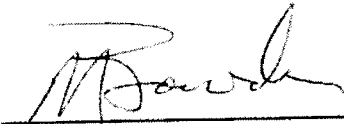
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Title and Approval Sheet

Title: Compliance Sampling Inspection Report
Hattiesburg South Wastewater Treatment Plant
Final Report

Approving Official:

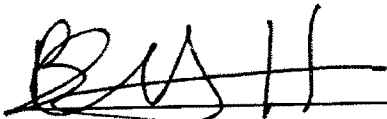


Mike Bowden, Chief
Enforcement Section
Enforcement and Investigations Branch

10/17/2011

Date

SESD Project Leader:



Richard Elliott, P.E.
Enforcement Section
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10/17/2011

Date

Table of Contents

Compliance Sampling Inspection Report	1
Title and Approval Sheet.....	2
EPA Form 3560-3.....	5
INTRODUCTION	6
BACKGROUND	6
SUMMARY OF FINDINGS & RECOMMENDATIONS	7
Findings	7
Recommendations	8
FACILITY ASSESSMENT	9
1. Facility Site Review	9
2. Permit Review	11
3. Records and Reports.....	11
4. Flow Measurement.....	11
5. Operations & Maintenance.....	11
6. Sludge Disposal	11
7. Facility Sampling.....	12
8. Effluent and Receiving Waters	12
FACILITY/EPA DATA DISCUSSION	12
EPA Sampling Methodology	12
Quality Assurance/Quality Control.....	13
CONCLUSIONS	19
REFERENCES.....	23
ATTACHMENTS.....	23
1. Photo log (3 Pages)	23
2. SEDS Analytical Results Report (53 Pages).....	23
3. Hattiesburg Wastewater Treatment Plant Time-of Travel Study (14 Pages)	23
4. Process Calculations (3 Pages)	23
END OF REPORT	23

List of Tables

TABLE 1.0 (SESD SAMPLING ACTIVITIES).....	13
TABLE 2.0 (INFLUENT DATA COMPARISON)	14
TABLE 3.0 (INTERNAL PROCESS & PRETREATMENT SAMPLES).....	15
TABLE 4.0 (HISTORICAL DATA REVIEW)	16
TABLE 5.0 (SUMMARY OF SEDS ANALYTICAL RESULTS)	18

List of Figures

FIGURE A – HATTIESBURG SOUTH WWTP AERIAL AND DIMENSIONS	10
FIGURE B – PROXIMITY OF MARSHALL DURBIN WWTP TO HATTIESBURG SOUTH LAGOONS.....	21
FIGURE C – HATTIESBURG SAMPLE LOCATIONS AND TREATMENT SYSTEM LAYOUT.....	22



United States Environmental Protection Agency
Washington, D.C. 20460

Water Compliance Inspection Report

— Section A: National Data System Coding (i.e., PCS)

Transaction Code	NPDES	yr/mo/day	Inspection Type	Inspector	Fac Type
N	MS0020303	11/07/26	S	J	1
Remarks					
Inspection Work Days	Facility Self-Monitoring Evaluation Rating	BI	QA	Reserved	

Section B: Facility Data

Name and Location of Facility Inspected (For industrial users discharging to POTW, also include POTW name and NPDES permit number) Hattiesburg South WWTP 1903 E. Hardy St., Hattiesburg, MS 39401	Entry Time/Date 0830 07/26/2011	Permit Effective Date June 07, 2010
	Exit Time/Date 1600 07/28/2011	Permit Expiration Date May 31, 2015
Name(s) of On-Site Representative(s)/Title(s)/Phone and Fax Number(s) Arnold Landrum, Water & Sewer General Manager, (601) 545-4530; and (601) 545-4689	Other Facility Data (e.g., SIC NA/ICS, and other descriptive information)	
Name, Address of Responsible Official/Title/Phone and Fax Number Mr. Matthew Boutwell, Director Water & Sewer, 900 James Street Hattiesburg, MS 39401 (601) 545-4530 (601) 545-4689 Fax		

Section C: Areas Evaluated During Inspection (Check only those areas evaluated)

<input checked="" type="checkbox"/> Permit	<input checked="" type="checkbox"/> Self-Monitoring Program	<input checked="" type="checkbox"/> Pretreatment	<input type="checkbox"/> MS4
<input checked="" type="checkbox"/> Records/Reports	<input type="checkbox"/> Compliance Schedules	<input type="checkbox"/> Pollution Prevention	
<input checked="" type="checkbox"/> Facility Site Review	<input type="checkbox"/> Laboratory	<input type="checkbox"/> Storm Water	
<input checked="" type="checkbox"/> Effluent/Receiving Waters	<input checked="" type="checkbox"/> Operations & Maintenance	<input type="checkbox"/> Combined Sewer Overflow	
<input checked="" type="checkbox"/> Flow Measurement	<input checked="" type="checkbox"/> Sludge Handling/Disposal	<input checked="" type="checkbox"/> Sampling	

Section D: Summary of Findings/Comments

(Attach additional sheets of narrative and checklists, including Single Event Violation codes, as necessary)

SEV Codes	SEV Description
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	_____
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	_____
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	_____
<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	_____

* See Attachment

Name(s) and Signature(s) of Inspector(s)	Agency/Office/Phone and Fax Numbers	Date
Richard Elliott	US EPA/706-355-8631 and 706-355-8744	10/17/2011
Louis Salguero	US EPA/706-355-8732 and 706-355-8744	10/17/2011
Reviewer/Section Chief		
Mike Bowden	US EPA/706-355-8734 and 706-355-8744	Date 10/17/2011

**COMPLIANCE SAMPLING INSPECTION
HATTIESBURG SOUTH WASTEWATER TREATMENT PLANT
HATTIESBURG, MISSISSIPPI
NPDES PERMIT MS0020303**

INTRODUCTION

During the week of July 25 – 29, 2011, representatives of the United States Environmental Protection Agency (USEPA) and the Mississippi Department of Environmental Quality (MDEQ) conducted a Compliance Sampling Inspection (CSI) at the Hattiesburg South Wastewater Treatment Plant (WWTP) in Hattiesburg, Mississippi. This inspection was requested by the USEPA Region 4 Water Protection Division in Atlanta, Georgia due to repeated non-compliance with the National Pollution Discharge Elimination System (NPDES) effluent permit limits and odor complaints from citizen.

The following individuals were present during the inspection:

<u>NAME</u>	<u>ORGANIZATION</u>	<u>TELEPHONE</u>
Richard Elliott	USEPA	706-355-8631
John Williams	USEPA	706-355-8735
Louis Salguero	USEPA	706-355-8732
Cornell Gayle	USEPA	706-355-8743
Jamon Rucker	MDEQ	601-961-5094
Arnold Landrum	WWTP	601-545-4530
Paul Hoffer	WWTP	601-545-4531

BACKGROUND

The overall objective of this CSI was to evaluate the operational performance of the WWTP and provide technical assistance. Specific tasks included characterization of the influent, assessing effluent quality, evaluating operations, and reviewing effluent quality data and other facility records. The following activities were conducted to meet the objective:

- Operational information was collected.
- Influent composite samples were collected and analyzed for conventional pollutants.
- Effluent composite samples were collected and analyzed.
- Grab samples for field parameters (e.g., pH, DO, and TRC) were collected.
- Wastewater from major industrial contributors were identified and characterized.
- The facility's self-monitoring program was evaluated.

SUMMARY OF FINDINGS & RECOMMENDATIONS

Findings

1. Analysis of the industrial influent wastewater indicated very high organic loadings. The BOD₅ and TSS influent concentrations from some contributors were above typical domestic wastewater values.
2. The EPA analytical results indicated elevated levels of effluent nutrients (Ammonia Nitrogen, Total Phosphorus etc). The current Ammonia Nitrogen level is higher than the phase II permit limits which will be in effect in the future .
3. On-site monitoring of the solids in lagoon #3 (depth sounding) indicated several areas of high sludge deposits.
4. Excessive sludge build-up was observed in several lagoons.
5. Thick vegetation was observed growing in lagoon #1(see photo # 812 & 813).
6. Excessive algae growth was observed in lagoon #1 (see Figure A). The other lagoons (2,3 & 4) had a dark brown color possibly due to industrial waste from USA Yeast.
7. Dead-zones and inadequate mixing were observed in all four lagoons.
8. The effluent flow meter was not operational. In addition, the flow meter design and instrumentation is non-standard. There is no established method of verifying instantaneous flow measurement independently.
9. Examination of samples from the lagoons under a light microscope indicated minimal microbial activity.
10. There is no septic waste hauler handling facility at the plant. Septic waste transported to the plant is not monitored or tested prior to discharging their contents. Septage is dumped at the side of lagoon#1 (see photo # 809 & 811 in Attachment 1).
11. At the designated location for dumping the septic waste, the embankment was eroded and there was a pool of water. This practice has also created a possible breeding ground for vectors.
12. There was visual evidence of short circuiting in lagoon #3 (based on dye injection observation).
13. The influent wastewater distribution was not optimized for best treatment.
14. Several aerators were inoperable or needed to be replaced.

15. Aerators were mainly located at the edges and corners of the lagoons and were not properly distributed in the treatment system to provide sufficient aeration for the entire lagoon.
16. A strong unpleasant odor was noticed in the vicinity of the influent flowing into lagoon #3.
17. A chicken processing facility (Marshall Durbin Chicken Plant) is located adjacent to the lagoons. This processing facility has a pretreatment wastewater plant that discharges to the Hattiesburg South WWTP. This chicken processing facility produces a pungent odor that could possibly be one of the sources for the community complaints (see Figure B).
18. Flows from the USA Yeast facility appeared to be the major contributor of the wastewater volume in lagoon #3.
19. Effluent from the final lagoon had a brown color.
20. A new aeration system was being installed in lagoon #3 at the time of this inspection.
21. Historical data review indicated that the permittee violated their NPDES permit limits on several occasions for the following parameters: BOD, TSS, TRC, NH₃-N and Fecal Coliform.

Recommendations

1. The flow measuring device should be replaced and/or repaired.
2. Vegetative growth inside the lagoons should be removed.
3. Address treatment overloading by implementing a structured pretreatment program that sets discharge limits for industrial users and includes regular inspections.
4. The excess sludge in the lagoon(s) should be removed in a timely manner and properly disposed of in accordance with the appropriate federal and state regulations.
5. An onsite septic waste receiving station should be constructed to properly handle septic haulers.
6. Relocate existing aerators in the lagoons to adequately supply oxygen to the entire lagoon.
7. The lagoon embankment should be stabilized. The access roads around the lagoons should be repaired.
8. Wastewater operation and maintenance training should be provided to staff.
9. The City should seek engineering consultation to investigate the feasibility and

appropriateness of continued use of the current treatment system as it is designed. Verify that the WWTP is capable of consistently meeting NPDES effluent permit limits.

10. The influent distribution system should be redesigned to minimize overloading and take advantage of dilution of the industrial influent with domestic influent prior to treatment.
11. A color attenuation process should be incorporated into the treatment system.
12. The permit should stipulate composite sampling for parameters such as BOD, TSS and $\text{NH}_3\text{-N}$.

FACILITY ASSESSMENT

The following discussion (pages 08 – 11) pertains to the areas evaluated in section C of the NPDES 3560 form.

1. Facility Site Review

The Hattiesburg South WWTP is a 20 MGD treatment facility located on 430 acres off East Hardy Street in Hattiesburg, Mississippi. The WWTP treats domestic and industrial wastewater from the City of Hattiesburg (Two sewer lines), City of Petal and surrounding areas in Forest County. The bulk of the industrial wastewater comes from a yeast manufacturer (USA Yeast) and a chicken processing facility (Marshall Durbin). The plant consists of four large lagoons (the average depth of the lagoons is approximately 10 feet) with floating aerators. Only one of the lagoons has flow directing baffles. Wastewater enters the lagoons via four force-mains. Influent enters into one of three lagoons (see Figure A – Hattiesburg South WWTP aerial). The wastewater then flows to a polishing lagoon (lagoon #4) before being chlorinated and discharged to the Leaf River via outfall 001.



Figure A – Hattiesburg South WWTTP Aerial and Dimensions

2. Permit Review

The NPDES permit became effective on June 7, 2010 and will expire on May 31, 2015. The outfall and the name of the receiving waters were as described in the permit. A copy of the current permit was kept at the operations office off-site. Typically, facilities of this size require composite samples for the major parameters listed in the permit. However, this permit does not require composite sampling for effluent parameters such as BOD₅ and TSS (see recommendation 12).

3. Records and Reports

Discharge Monitoring Reports (DMRs) records and laboratory reports for December 2010 were checked for agreement with NPDES self-monitoring program requirements regarding sampling documentation, equipment calibration, and reporting of parameter concentrations and loadings. The self-monitoring records were kept for a minimum of three years. The self-monitoring records consisted of the following:

- DMRs
- Analytical data/laboratory reports
- Daily operating log/sheets
- Bench sheets/calibration records
- Chain-of-custody forms

4. Flow Measurement

The facility's effluent flow was measured using a Halmi Nozzle (Model 42PFS-HN). This flow meter is a non-standard inline flow measurement device. It was not possible to conduct an instantaneous flow calibration check because the flow meter was not operational at the time of this inspection (see recommendation 1).

5. Operations & Maintenance

The WWTP was staffed during the day by at least one certified operator. Maintenance activities were performed by the operator or by contractors as needed.

6. Sludge Disposal

The WWTP does not have sludge handling facilities on site as oxidation lagoons are not generally required to maintain sludge handling facilities. However, sludge build-up was observed in some areas of the lagoon (see photo #812). According to the operator, no significant sludge removal from the lagoon has taken place since construction. A cursory check of the amount of solids deposited in Lagoon #3 revealed sludge build up of at least 3 ft (see recommendation 4).

7. Facility Sampling

The permittee collected samples according to the sampling frequencies and sample types described in the permit. Effluent grab samples were collected for pH, DO, TRC, NH₃-N, FC, TSS, and BOD₅ analyses.

8. Effluent and Receiving Waters

The final effluent was brown in color. However, there were no visible oil sheens or excess foaming observed in the final effluent.

FACILITY/EPA DATA DISCUSSION

EPA Sampling Methodology

The WWTP had multiple points where influent wastewater entered the treatment system (see Figure C). As such, either grab or composite influent samples were collected based on SEDS's assessment of the particular location. In addition, a pretreatment 24-hour composite sample was collected at the USA Yeast pumping station. All influent samples collected were analyzed for Total Phosphorus (TP), total Kjeldahl nitrogen (TKN), nitrate/nitrite (NO₂/NO₃), BOD₅, TSS, and NH₃-N.

Effluent 24-hour composite samples were collected at outfall 001 using an ISCO (Model 3700) automatic sampler (see Attachment 2 for detailed results). Samples were collected and analyzed for Total Phosphorus (TP), total Kjeldahl nitrogen (TKN), nitrate/nitrite, BOD₅, TSS, NH₃-N and metals.

Effluent grab samples were also collected from outfall 001 for Fecal Coliform, Dissolved Oxygen (DO), pH and temperature analyses. The sample collected for fecal coliform bacteria (FC) was analyzed by MDEQ at EPA's request.

Internal (in-plant) or 'process' grab samples were collected at designated locations (see Figure C) and analyzed for BOD₅ and TSS. Grab samples were also collected upstream and downstream of the outfall 001 and analyzed for the same parameters as the plant effluent.

A continuous recording automatic sampler capable of reading DO, pH, Temperature, Specific Conductivity and Turbidity at 10 minute intervals was installed upstream and downstream of outfall 001 and collected data continuously for 24-hours.

A time of travel study using Rhodamine dye as a tracer was conducted during this inspection (see Attachment 3). The tracer study was used to determine the detention time of the wastewater in the treatment system and to investigate the possibility of short-circuiting of the treatment process. The study was conducted over approximately 20 days.

Table 1.0 summarizes the pertinent information on all grab and composite samples collected during this inspection. It describes the composite sample locations, the equipment used and parameters collected, the aliquot collected, and the frequency of collection for each composite sample during the compositing period.

**Table 1.0 (SESD Sampling Activities)
Hattiesburg South WWTP
Hattiesburg, Mississippi**

Location	Equipment/Parameters	Aliquot	Frequency
Influent – (collected at the end of sewer pipe – sample A, D, G, H Figure C)	Grab Samples collected manually. Parameters - BOD ₅ , TSS, NH ₃ -N, Nitrate/Nitrite, Total Kjeldahl, Total Phosphorus	-	During discharge
Influent – Industrial (collected at Pump Station)	Composite Samples collected using an ISCO – 3700 portable automatic sampler. Parameters - BOD ₅ , TSS, NH ₃ -N, Nitrate/Nitrite, Total Kjeldahl, Total Phosphorus.	150 mL	Every 15 minutes over 24 hours
Effluent – 001 (collected after aeration cascade steps – sample J Figure C)	Composite Samples collected using an ISCO – 3700 portable automatic sampler. Parameters - BOD ₅ , TSS, NH ₃ -N, Nitrate/Nitrite, Total Kjeldahl, Total Phosphorus. Grab samples for fecal coliform.	130 mL	Every 15 minutes over 24 hours
Surface Water – Upstream/ Downstream (collected at pump industrial facility station)	Grab Samples collected manually. Parameters - BOD ₅ , TSS, NH ₃ -N, Nitrate/Nitrite, Total Kjeldahl, Total Phosphorus. Grab samples for fecal coliform.	-	-

Quality Assurance/Quality Control

Two preservative and two equipment rinse blanks were collected in 1-liter plastic containers filled with analyte-free water and analyzed for metals and nutrients. The preservative blanks were used to assess possible sample contamination during preservation and transporting the samples. The equipment blanks were used to determine contamination from the equipment used to collect the samples. The analytical results for the preservative blanks indicated that no analytes were detected above the reporting limit. Zinc was (very low concentration) detected in the equipment rinse blank for sample location HTSO-0029 (Hattiesburg South Outfall 001).

All samples collected onsite by EPA personnel remained in the custody of EPA personnel and were transported to the SESD laboratory for analyses. MDEQ personnel collected and analyzed samples for fecal coliform bacteria. All samples collected by MDEQ personnel were handled in accordance with the appropriate procedures outlined in the MDEQ's standard operating manual. Samples analyzed by SESD personnel were analyzed in accordance with the *SESD Analytical Support Branch Laboratory Operations and Quality Assurance Manual, January 6, 2011*. EPA sampling methods, field measurements, and calibration procedures were conducted in accordance with the following EPA Region 4 operating procedures:

- i. Field pH Measurement (SESDPROC-100-R2)
- ii. Field Temperature Measurement (SEDPROC-102-R3)
- iii. Field Measurement of Dissolved Oxygen (SEDPROC-106-R2)
- iv. Field Wastewater Flow Measurement (SESDPROC-109-R3)
- v. Global Positioning System (SEDPROC-110-R3)
- vi. In-Situ Water Quality Monitoring (SEDPROC-111-R2)
- vii. Surface Water sampling (SEDPROC-201-R1)
- viii. Wastewater Sampling (SESDPROC-306-R2)
- ix. Dye Tracer Measurements (SESDPROC-514-R0)

Data qualifiers are added to analytical data as needed to enhance data integrity. The qualifiers supplied with the Total Kjeldahl Nitrogen and Total Phosphorus values are included because of matrix interference. The reported values are conservative and are considered biased low.

Table 2.0 shows a comparison between typical domestic influent wastewater pollutant concentrations and the influent analytical results obtained during the EPA sampling of WWTP. The influent data results indicate that high strength wastewater entered the lagoons from COH2 and USAY sample locations. The influent from COH2 may be elevated due to industrial organic loading from the chicken processing facility.

High strength influent can cause organic overloading if the treatment system was not designed to accommodate the elevated loading. In addition, the quantity of the high strength wastewater significantly affects treatability.

Table 2.0 (Influent Data Comparison)
Hattiesburg South WWTP
Hattiesburg, Mississippi

Parameter (mg/L)	Typical Untreated Wastewater Value*			Influent Result		
	Low	Medium	High	COH1	COH2	USAY
BOD ₅	110	190	350	81A	340	620L
Suspended Solids	120	210	400	87	290	640
Ammonia NH ₃ -N	12	25	45	9.7	29	8.8
Total Kjeldahl Nitrogen	20	40	70	19	39	170CR, D2
Total Phosphorus	4	7	12	1.9	8.6	11J, D2

* - Metcalf & Eddy, Wastewater Treatment and Reuse 4th Edition, pg 186

COH1- City of Hattiesburg Pump Station

COH2- City of Hattiesburg Burkett Creek Pump Station

USAY- USA Yeast pipe entering Lagoon #3

A - The analyte was analyzed in replicate. Reported value is an average of the replicates

J - The identification of the analyte is acceptable; reported value is an estimate

L - The identification of the analyte is acceptable; reported value may be biased low. The actual value is expected to be greater than the reported value

CR - The presence of a large amount of black precipitate present in sample both sample before and after digestion could have resulted in matrix interference

D2 - Due to matrix interference, the sample cannot be accurately quantified. The reported result is qualitative

Table 3.0 summarizes the results obtained from samples collected at various internal 'process' locations. The objective of collecting samples at these locations was to track BOD₅ and TSS removal as wastewater progresses through the lagoons. In addition, table 3.0 shows the results

for a composite sample collected at the pumping station that pumps industrial wastewater from the USA Yeast facility to the Hattiesburg treatment plant. The results indicated high strength wastewater at this sample location.

Table 3.0 (Internal Process & Pretreatment Samples)
Hattiesburg South WWTP
Hattiesburg, Mississippi

Parameter (mg/L)	Typical Untreated Wastewater Value*			Internal 'Process' Samples			Pretreat. (USAY)
	Low	Medlum	High	L1 to L2	L3 to L2	L2 to L4	
BOD ₅	110	190	350	100A	93A	62A	300L
Suspended Solids	120	210	400	390	190	100	640
Ammonia NH ₃ -N	12	25	45	---			26
Total Kjeldahl Nitrogen	20	40	70	---			250CR, D2
Total Phosphorus	4	7	12	---			17J, D2

* - Metcalf & Eddy, Wastewater Treatment and Reuse 4th Edition, pg 186

L1 to L2 – Sample taken where wastewater flow from Lagoon #1 to Lagoon #2

L3 to L2 – Sample taken where wastewater flow from Lagoon #3 to Lagoon #2

L2 to L4 – Sample taken where wastewater flow from Lagoon #2 to Lagoon #4

Pretreat. (USAY)- USA Yeast off site pumping station

A - The analyte was analyzed in replicate. Reported value is an average of the replicates

J - The identification of the analyte is acceptable; reported value is an estimate

L - The identification of the analyte is acceptable; reported value may be biased low. The actual value is expected to be greater than the reported value

CR - The presence of a large amount of black precipitate present in sample both sample before and after digestion could have resulted in matrix interference

D2 – Due to matrix interference, the sample cannot be accurately quantified. The reported result is qualitative

Table 4.0 shows a summary of the facility's self-monitoring data from April 2008 through March 2011. This data was obtained from the online data base (PCS) maintained by EPA. There are discrepancies in the data that the facility reports to EPA (such as the BOD max for June 30, 2010) but overall the self-monitoring records show numerous violations. During this time period, violations occurred for BOD₅, TSS, NH₃-N, TRC, and fecal coliform bacteria.

Table 4.0 (Historical Data Review)
Hattiesburg South WWTP
Hattiesburg, Mississippi

Date	BOD 5-day (mg/L)		Total Suspended Solids (mg/L)		Flow (mgd)	pH	NH3-N (mg/L)	Total Residual Chlorine (mg/L)		Fecal Coliform	
	Avg ₌₃₅	Max ₌₅₃	Avg ₌₉₀	Max ₌₁₃₅				Avg _{=0.14}	Max _{=0.21}	Avg ¹	Max ¹
30-Apr-08	5	5	14	14	12.9	7.01	Report	0.07	0.09	20	20
31-May-08	5	5	6	6	8.8	7.11		0.08	0.11	166	700
30-Jun-08	12	12	6	6	7.2	7.11		0.07	0.09		
31-Jul-08	15	15	22	22	7.4	7.88		0.1	0.12	20	20
31-Aug-08	20	20	34	34	7.4	7.61		0.09	0.11	199	1600
30-Sep-08	12	12	14	14	14.4	7.36		0.1	0.12	2200	2200
31-Oct-08	7	7	15	15	9.6	7.04		0.11	0.14	20	20
30-Nov-08	6	6	19	19	8.2	6.63		0.1	0.12		
31-Dec-08	7	7	21	21	12.9	7.14		0.12	0.14		
31-Jan-09	14	14	18	18	13.8	7.11	Report	0.12	0.14	1700	1700
28-Feb-09	12	12	23	23	12.2	7.16		0.12	0.13	80	80
31-Mar-09	5	5	16	16	12.7	6.8		0.12	0.15		
30-Apr-09	6	6	18	18	16.5	7.13		0.12	0.14	500	500
31-May-09	5	5	36	36	15.5	7.11		0.1	0.13		
30-Jun-09	5	5	14	14	11.3	7.03		0.1	0.13		
31-Jul-09	10	10	24	24	8.7	6.93		0.1	0.12	70	70
31-Aug-09	12	12	13	13	8.3	6.92		0.09	0.12		
30-Sep-09	8	8	11	11	8.9	7.63		0.12	0.13	133	220
31-Oct-09	8	8	21	21	10.8	7.23		0.13	0.14	80	80
30-Nov-09	10	10	27	27	9.1	7.55		0.12	0.14	140	140
31-Dec-09	10	10	17	17	14.4	7.64		0.12	0.13	220	220
31-Jan-10	10	10	28	28	8.1	7.58	Report	0.1	0.12	90	90
28-Feb-10	13	13	17	17	9.1	7.15		0.12	0.13	1439	9000
31-Mar-10	13	13	11	11	14.8	7.34		0.12	0.15		
30-Apr-10	25	25	12	12	12.3	7.41		0.13	0.14		
31-May-10	14	14	10	10	13.7	7.42		0.13	0.16		
30-Jun-10	56	8512	50	50	13.7	7.47		0.16	0.16		
31-Jul-10	20*	43*	52	52	9.5	7.41	7	0.15**	0.18**	40	40
31-Aug-10	18*	18*	89	110	10.58	7.38	4	0.13**	0.15**	110	300
30-Sep-10	33*	33*	71	71	9.3	7.29	2.7	0.13**	0.15**	130	130
31-Oct-10	57*	81*	86	86	7.8	7.21	5	0.13**	0.15**	110	110
30-Nov-10	46*	65*	83	83	8.6	7.45	9	0.11**	0.13**	95	9000
31-Dec-10	88*	132*	67	67	8.9	7.38	6	0.1**	0.12**		
31-Jan-11	76*	80*	28	28	10.6	7.09	8	0.12**	0.16**	110	110
28-Feb-11	63*	63*	50	50	12.6	7.43	14	0.43**	0.74**	126	16000
31-Mar-11	106*	121*	114	165	15	7.26	17	0.33**	0.62**		

* - BOD limit Avg. = 30; Max. = 45

** - TRC limit Avg. = 0.134; Max. = 0.23

! Fecal Coli. limit seasonal (May - Oct.) Avg. = 200, Max. = 400; (Nov. - Apr.) Avg. = 2,000, Max. = 4,000
Permit limit exceedence show in bold red

Table 5.0 summarizes the analytical results obtained by the SEDS and MDEQ laboratories. The permit limits shown in table 5.0 are taken from the most recent permit. The permit became effective on June 07, 2010 and will expire on May 31, 2015. Surface water sampling results are also shown in table 5.0 for comparison with the outfall results. At the time of this inspection, the results indicate that the Leaf River has better water quality than the effluent from the WWTP for all parameters except fecal coliform.

The analytical results obtained from the EPA sampling of Hattiesburg South WWTP showed that the facility's effluent parameters were within permit limits. Analysis was also done by SEDS for metals and mercury on both influent and effluent from the Hattiesburg South WWTP (see Attachment 2). The highest metal concentrations reported were from Calcium, Magnesium, Potassium and Sodium.

The results obtained from the dye study (see Attachment 3) at the Hattiesburg South WWTP did not provide an exact detention time. A longer monitoring period is required to obtain data that can provide a definite time of travel. However, visual inspection of the dye movement after injection suggested that short-circuiting takes place in the treatment system. Short-circuiting reduces the amount of time the influent wastewater stays in the WWTP and therefore negatively impacts effluent quality.

Table 5.0 (Summary of SED Analytical Results)
Hattiesburg South WWTP
Hattiesburg, Mississippi

Parameter	Monthly Avg.	Weekly Max.	Monitoring Frequency	Surface Water Upstream	Surface Water Downstream	Effluent Results
Flow (MGD)	20.0	Report	3 Times/Week	---	---	11.9**
Composite Samples						
BOD, 5-day (mg/L)	30	45	Monthly	4.0K	2.7	28 A
Suspended Solids (mg/L)	90	135	Monthly	26	27	47
Ammonia NH ₃ -N (mg/L)	Report	Report	Monthly	0.11	0.32	19
Total Nitrogen (mg/L)	Report	Report	Quarterly	1.13	1.57	39.1
Total Phosphorus (mg/L)	Report	Report	Quarterly	0.16	0.28	11
Grab Samples						
pH (Standard Units)	6.0 – 9.0	Monthly	Monthly	6.5	6.7	7.22
TRC (mg/L)	0.134	0.23	Daily	---	---	---
Fecal Coliform (Col/100 mL)*	200	400	Twice/season	500	500	<20
Non-Permitted Parameters						
Temperature (deg °C)				27.5	27.4	30.0
Dissolved Oxygen (mg/L)				6.2	6.1	3.3
Nitrate/Nitrite (mg/L)	---	---	---	0.44	0.47	0.06
TKN (mg/L)				0.69J, QM1	1.1	39

* - Seasonal Limitations (May-Oct. permit limits). Result provided by MDEQ Laboratory

** - Measured by portable flow meter

I - Surface Water samples are collected as grabs

A - The analyte was analyzed in replicate. Reported value is an average of the replicates.

J - The identification of the analyte is acceptable; reported value is an estimate.

K - The identification of the analyte is acceptable; reported value may be biased high. The actual value is expected to be less than the reported value

QM1 - Matrix Spike recovery less than method control limits.

CONCLUSIONS

The findings observed during the CSI and the analytical results obtained from the samples collected indicate that non-compliance at the Hattiesburg South WWTP generally stem from a combination of four factors:

1. Organic loading – The Hattiesburg South WWTP receives high strength wastewater, in lagoons #2 and #3. This high strength wastewater is applied over a small area and therefore the typical organic loading rates for lagoons are exceeded (see Attachment 4). Organic overloading reduces the overall treatment effectiveness of the plant and creates several issues such as reduced dissolved oxygen levels and the production and release of noxious odor compounds. In addition, organic overloading can become toxic to the bacteria necessary for treatment in natural systems which can lead to insufficient organic matter conversion. Excess organic loading promotes the buildup of solids in the lagoon. Solids build up in the lagoon reduces the overall detention time of the wastewater in the treatment process, and as a result, an effluent of lesser quality is produced. In addition, significant settling and build up was noticed in several dead-zones in the lagoon.
2. Design – A thorough engineering study of the limitations of the current treatment systems and an analysis of the available wastewater treatment technologies would be beneficial to the City of Hattiesburg. A key element to be considered in such a study is whether a redesigned natural system (lagoons) or a more mechanically intensive treatment option is best suited for this plant. The WWTP as it is currently configured, could improve in overall plant performance by combining the flow from the industrial and domestic users. The domestic wastewater would dilute the strength of the industrial wastewater as well as provide a constant supply of viable bacteria to assist in organic matter conversion. To be clear, it is possible to use lagoons to provide treatment for high strength wastewater. However, these facilities differ in design from Hattiesburg South in that they distribute the influent wastewater in several smaller lagoons rather than one large lagoon. They also include several separate treatment trains operating in parallel with each train comprising multiple ponds in series. Phase I of the current NPDES permit does not stipulate nutrient loading limits. However, future improvements to the WWTP by the City of Hattiesburg should consider incorporating a nutrient removal process capable of at least meeting phase II Ammonia Nitrogen limits but preferably providing phosphorus removal as well.
3. Aeration – Several aerators were in use in the lagoons at the time of this inspection. However, most are located close to the edge of the lagoon embankment and do not effectively deliver oxygen to the entire lagoon. Adequate aeration is required to supply the oxygen bacteria need to grow and covert organic matter as well as to suppress unpleasant odors. Proper aerator placement also assists in directing the flow of wastewater around the lagoon and thereby reducing the possibility of short-circuiting. Water will find the shortest and easier path through the treatment system. Therefore, any improvement that minimizes short-circuiting will improve effluent quality. It is worth noting that increased aeration by itself will not provide massive improvements if there are not enough microbes to utilize the oxygen supplied by the aerators.

4. Pretreatment – Regardless of the design or type of treatment facility used, a rigorous pretreatment program is essential to consistently meeting NPDES permit requirements. This is particularly important when dealing with high strength wastewater as is the case with the Hattiesburg South WWTP. A pretreatment program that sets loading limits and monitors industrial users would assist the operators of the treatment plant in consistently meeting effluent permit limits.

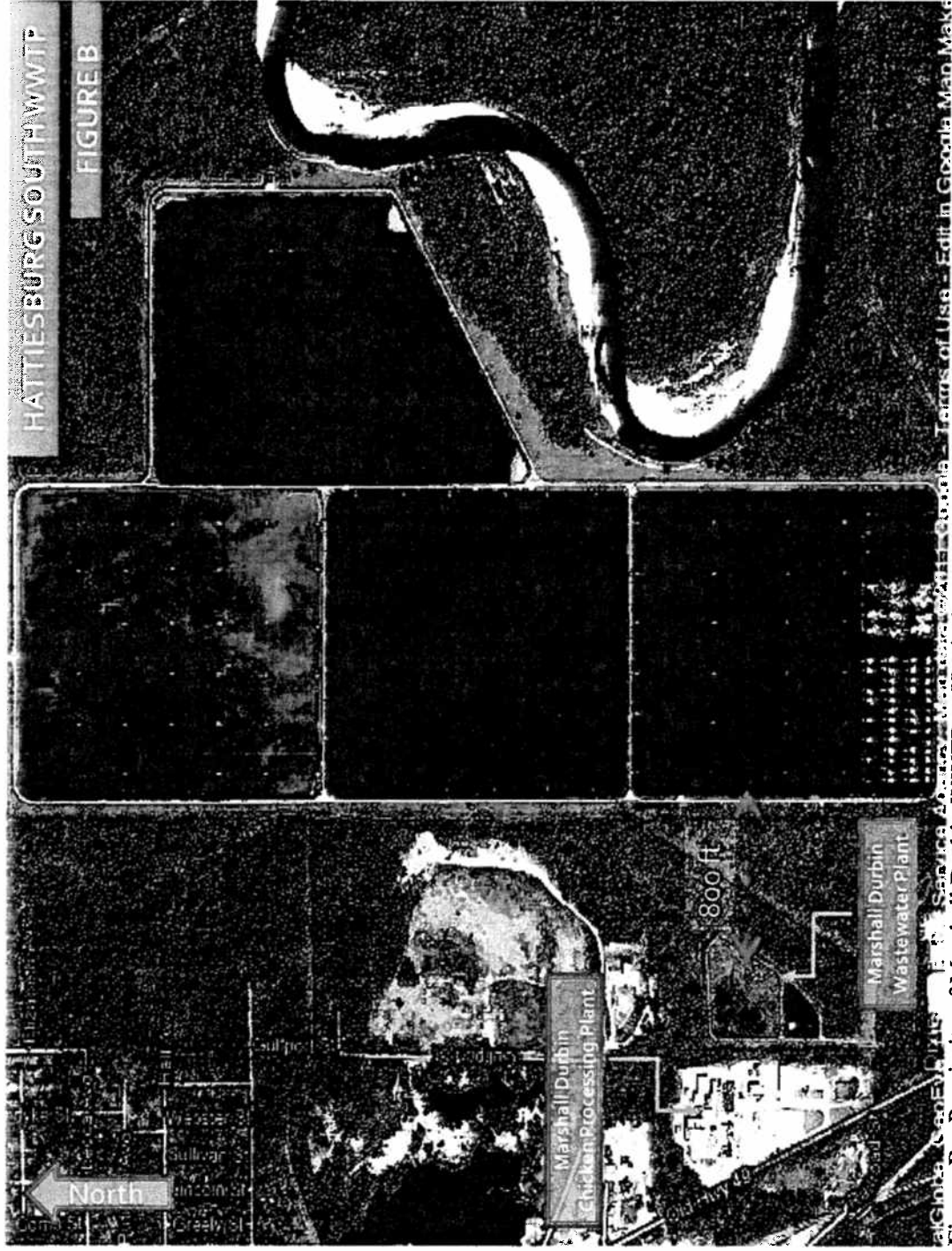


Figure B – Proximity of Marshall Durbin WWTP to Hattiesburg South Lagoons.

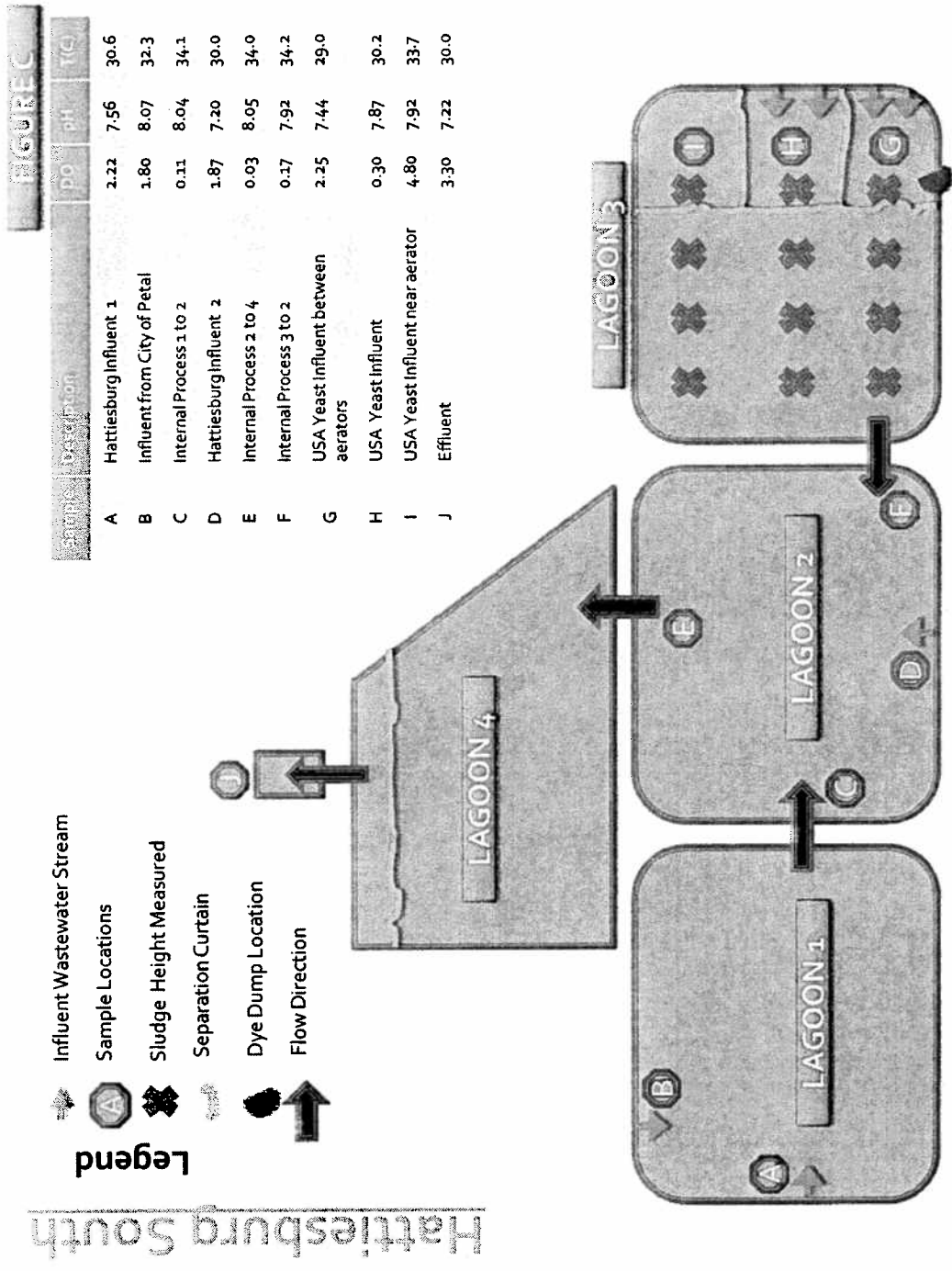


Figure C – Hattiesburg Sample locations and treatment system layout.

REFERENCES

1. Wastewater Engineering: Treatment and Reuse, 4th Edition, Metcalf and Eddy, 2003
2. Environmental Reference Manual, 2nd Edition, Michael R. Lindeburg, 2003
3. USDI Water Measurement Manual, 3rd Edition, 2001
4. USEPA Process Control Workbook
5. USEPA Operations of Wastewater Treatment Plants

ATTACHMENTS

1. Photo log (3 Pages)
2. SEDS Analytical Results Report (53 Pages)
3. Hattiesburg Wastewater Treatment Plant Time-of Travel Study (14 Pages)
4. Process Calculations (3 Pages)

END OF REPORT

**Hattiesburg South WWTP
Photo Log**

ATTACHMENT 1



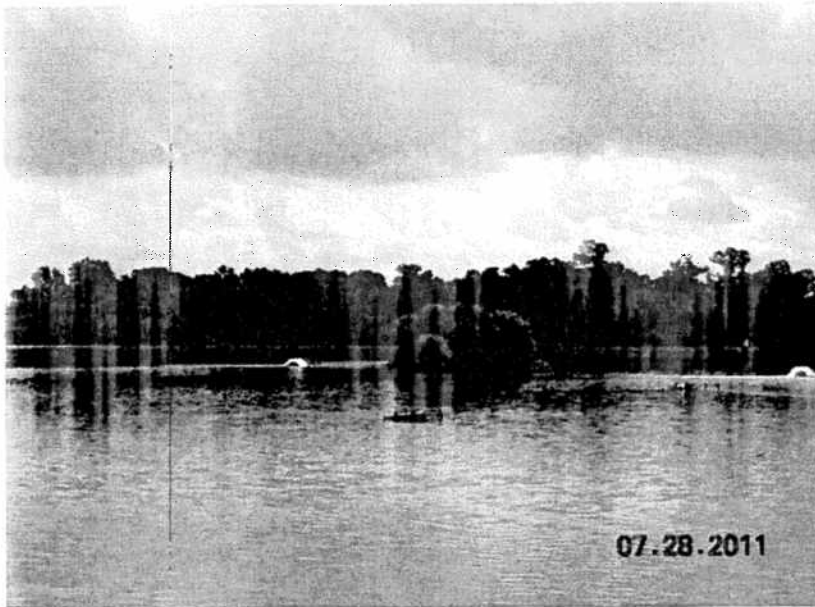
Above: Photo 809 – Area in lagoon #1 where septage is being dumped. Lagoon embankment is eroded.



Above: Photo 811 – Area in lagoon #1 where septage is being dumped.

**Hattiesburg South WWTP
Photo Log**

ATTACHMENT 1



Above: Photo 812 – Vegetation growing in lagoon due to high sludge.



Above: Photo 813 – Vegetation growing in lagoon.

**Hattiesburg South WWTP
Photo Log**

ATTACHMENT 1



Above: Photo 798 – Aerator located very close to embankment.

Photographs were taken by Richard Elliott and Cornell Gayle during site visit on July 25 – 29, 2011.



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September 8, 2011

4SESD-ASB

MEMORANDUM

SUBJECT: FINAL Analytical Report
 Project: 11-0591, Hattiesburg South Lagoon CSI
 Compliance Monitoring

FROM: Jenny Scifres
 ASB Inorganic Chemistry Section Chief

THRU: Gary Bennett, Chief
 Analytical Support Branch

TO: Richard Elliott

Attached are the final results for the analytical groups listed below. These analyses were performed in accordance with the Analytical Support Branch's (ASB) Laboratory Operations and Quality Assurance Manual (ASB LOQAM) found at www.epa.gov/region4/sesd/asbsop. Any unique project data quality objectives specified in writing by the data requestor have also been incorporated into the data unless otherwise noted in the Report Narrative. Chemistry data have been verified based on the ASB LOQAM specifications and may have been qualified if the applicable quality control criteria were not met. For a listing of specific data qualifiers and explanations, please refer to the Data Qualifier Definitions included in this report. The reported results are accurate within the limits of the method(s) and are representative only of the samples as received by the laboratory.

Analyses Included in this report:

Method Used:

Classical/Nutrient Analyses (CNA)

Ammonia/TKN	EPA 350.1
Ammonia/TKN	EPA 351.2
Demand	SM 5210B
Nitrate and/or Nitrite	EPA 353.2
Phosphorous	EPA 365.1
Solids	SM 2540D



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Sample Disposal Policy

Because of the laboratory's limited space for long term sample storage, our policy is to dispose of samples on a periodic schedule. Please note that within 60 days of this memo, the original samples and all sample extracts and/or sample digestates will be disposed of in accordance with applicable regulations. The 60-day sample disposal policy does not apply to criminal samples which are held until the laboratory is notified by the criminal investigators that case development and litigation are complete.

These samples may be held in the laboratory's custody for a longer period of time if you have a special project need. If you wish for the laboratory to hold samples beyond the 60-day period, please contact our Sample Control Coordinator, Debbie Colquitt, by e-mail at Colquitt.Debbie@epa.gov, and provide a reason for holding samples beyond 60 days



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SAMPLES INCLUDED IN THIS REPORT

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID	Laboratory ID	Matrix	Date Collected	Date Received
HTSO-0001	E113108-01	Preservative Blank	7/27/11 16:36	7/29/11 9:01
HTSO-0022	E113108-05	Surface Water	7/27/11 09:45	7/29/11 9:01
HTSO-0024	E113108-06	Surface Water	7/27/11 09:45	7/29/11 9:01
HTSO-0018	E113108-07	Municipal Eff. Wastewater	7/27/11 14:02	7/29/11 9:01
HTSO-0020	E113108-09	Municipal Eff. Wastewater	7/27/11 14:02	7/29/11 9:01
HTSO-0043	E113108-10	Wastewater	7/27/11 14:17	7/29/11 9:01
HTSO-0044	E113108-11	Wastewater	7/27/11 13:31	7/29/11 9:01
HTSO-0045	E113108-12	Wastewater	7/27/11 13:13	7/29/11 9:01
HTSO-0049	E113108-16	Wastewater	7/27/11 14:17	7/29/11 9:01
HTSO-0050	E113108-17	Wastewater	7/27/11 13:31	7/29/11 9:01
HTSO-0051	E113108-18	Wastewater	7/27/11 13:13	7/29/11 9:01
HTSO-0033	E113108-19	Municipal Proc. Wastewater	7/27/11 11:33	7/29/11 9:01
HTSO-0052	E113108-20	Municipal Proc. Wastewater	7/27/11 11:11	7/29/11 9:01
HTSO-0053	E113108-21	Municipal Proc. Wastewater	7/27/11 11:43	7/29/11 9:01
HTSO-0012	E113108-22	Wastewater	7/27/11 16:05	7/29/11 9:01
HTSO-0023	E113108-23	Surface Water	7/27/11 09:30	7/29/11 9:01
HTSO-0025	E113108-24	Surface Water	7/27/11 09:30	7/29/11 9:01



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D.A.R.T. Id: 11-0591

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DATA QUALIFIER DEFINITIONS

U	The analyte was not detected at or above the reporting limit.
A	The analyte was analyzed in replicate. Reported value is an average value of the replicates.
CR	Presence of a large amount of black precipitate present in sample both before and after digestion and could have resulted in matrix interference
CRa	Presence of a large amount of black precipitate present in sample both before and after digestion and could have resulted in matrix interference.
D-2	Due to Matrix Interference, the sample cannot be accurately quantified. The reported result is qualitative.
J	The identification of the analyte is acceptable; the reported value is an estimate.
K	The identification of the analyte is acceptable; the reported value may be biased high. The actual value is expected to be less than the reported value.
L	The identification of the analyte is acceptable; the reported value may be biased low. The actual value is expected to be greater than the reported value.
OM-1	Matrix Spike Recovery less than method control limits
QR-1	MRL verification recovery less than lower control limits.

ACRONYMS AND ABBREVIATIONS

CAS	Chemical Abstracts Service Note: Analytes with no known CAS identifiers have been assigned codes beginning with "E", the EPA ID as assigned by the EPA Substance Registry System (www.epa.gov/srs), or beginning with "R4-", a unique identifier assigned by the EPA Region 4 laboratory.
MDL	Method Detection Limit - The minimum concentration of a substance (an analyte) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero.
MRL	Minimum Reporting Limit - Analyte concentration that corresponds to the lowest demonstrated level of acceptable quantitation. The MRL is sample-specific and accounts for preparation weights and volumes, dilutions, and moisture content of soil/sediments.
TIC	Tentatively Identified Compound - An analyte identified based on a match with the instrument software's mass spectral library. A calibration standard has not been analyzed to confirm the compound's identification or the estimated concentration reported.



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D.A.R.T. Id: 11-0591

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Classical/Nutrient Analyses

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0001

Lab ID: E113108-01

Station ID:

Matrix: Preservative Blank

Date Collected: 7/27/11 16:36

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	0.050	U	mg/L	0.050	8/09/11 9:28	8/11/11 14:43	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	0.050	U, J, QR-1	mg/L	0.050	8/10/11 12:16	8/10/11 12:16	EPA 351.2
E701177	Nitrate/Nitrite as N	0.050	U	mg/L	0.050	8/24/11 18:16	8/24/11 18:16	EPA 353.2
7723-14-0	Total Phosphorus	0.010	U, J, QR-1	mg/L	0.010	8/12/11 8:45	8/15/11 14:14	EPA 365.1



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Project: 11-0591, Hattiesburg South Lagoon CSI - Reported by Jenny Scifres

Classical/Nutrient Analyses

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0022

Lab ID: E113108-05

Station ID: DNSTRM

Matrix: Surface Water

Date Collected: 7/27/11 9:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1640606	BOD, 5 Day	2.7		mg/L	2.0	7/29/11 9:04	7/29/11 9:04	SM 5210B
E1642818	Total Suspended Solids	27		mg/L	4.0	8/03/11 21:10	8/03/11 21:10	SM 2540D



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Classical/Nutrient Analyses

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0024

Lab ID: E113108-06

Station ID: DNSTRM

Matrix: Surface Water

Date Collected: 7/27/11 9:45

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	0.32		mg/L	0.050	8/09/11 9:28	8/11/11 14:43	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	1.1		mg/L	0.050	8/10/11 12:16	8/10/11 12:16	EPA 351.2
E701177	Nitrate/Nitrite as N	0.47		mg/L	0.050	8/24/11 18:16	8/24/11 18:16	EPA 353.2
7723-14-0	Total Phosphorus	0.28		mg/L	0.010	8/12/11 8:45	8/15/11 14:14	EPA 365.1



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Classical/Nutrient Analyses

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0018

Lab ID: E113108-07

Station ID: EFF001

Matrix: Municipal Eff. Wastewater

Date Collected: 7/27/11 14:02

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1640606	BOD, 5 Day	28	A	mg/L	2.0	7/29/11 12:35	7/29/11 12:35	SM 5210B
E1642818	Total Suspended Solids	47		mg/L	4.0	8/03/11 21:10	8/03/11 21:10	SM 2540D



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D.A.R.T. Id: 11-0591

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Classical/Nutrient Analyses

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSQ-0020

Lab ID: E113108-09

Station ID: EFF001

Matrix: Municipal Eff. Wastewater

Date Collected: 7/27/11 14:02

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	19		mg/L	0.50	8/09/11 9:28	8/11/11 14:43	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	39		mg/L	1.0	8/10/11 12:16	8/10/11 12:16	EPA 351.2
E701177	Nitrate/Nitrite as N	0.060		mg/L	0.050	8/24/11 18:16	8/24/11 18:16	EPA 353.2
7723-14-0	Total Phosphorus	11		mg/L	1.0	8/12/11 8:45	8/15/11 14:14	EPA 365.1



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D.A.R.T. Id: 11-0591

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Classical/Nutrient Analyses

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0043

Lab ID: E113108-10

Station ID: INFL

Matrix: Wastewater

Date Collected: 7/27/11 14:17

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1640606	BOD, 5 Day	81	A	mg/L	2.0	7/29/11 12:47	7/29/11 12:47	SM 5210B
E1642818	Total Suspended Solids	87		mg/L	4.0	8/03/11 21:10	8/03/11 21:10	SM 2540D



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Classical/Nutrient Analyses

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0044

Lab ID: E113108-11

Station ID: INFL

Matrix: Wastewater

Date Collected: 7/27/11 13:31

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1640606	BOD, 5 Day	620	L	mg/L	2.0	7/29/11 11:58	7/29/11 11:58	SM 5210B
E1642818	Total Suspended Solids	640		mg/L	4.0	8/03/11 21:10	8/03/11 21:10	SM 2540D



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Classical/Nutrient Analyses

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0045

Lab ID: E113108-12

Station ID: INFL

Matrix: Wastewater

Date Collected: 7/27/11 13:13

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1640606	BOD, 5 Day	340		mg/L	2.0	7/29/11 11:38	7/29/11 11:38	SM 5210B
E1642818	Total Suspended Solids	290		mg/L	4.0	8/03/11 21:10	8/03/11 21:10	SM 2540D



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Classical/Nutrient Analyses

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0049

Lab ID: E113108-16

Station ID: INFL

Matrix: Wastewater

Date Collected: 7/27/11 14:17

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	9.7		mg/L	0.50	8/09/11 9:28	8/11/11 14:43	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	19		mg/L	1.0	8/10/11 12:16	8/10/11 12:16	EPA 351.2
E701177	Nitrate/Nitrite as N	0.050	U	mg/L	0.050	8/24/11 18:16	8/24/11 18:16	EPA 353.2
7723-14-0	Total Phosphorus	1.9	J, QR-1	mg/L	1.0	8/12/11 8:45	8/15/11 14:14	EPA 365.1



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Classical/Nutrient Analyses

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0050

Lab ID: E113108-17

Station ID: INFL

Matrix: Wastewater

Date Collected: 7/27/11 13:31

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	8.8		mg/L	0.50	8/09/11 9:28	8/11/11 14:43	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	170	CRA, D-2	mg/L	5.0	8/10/11 12:16	8/10/11 12:16	EPA 351.2
E701177	Nitrate/Nitrite as N	0.75		mg/L	0.050	8/24/11 18:16	8/24/11 18:16	EPA 353.2
7723-14-0	Total Phosphorus	11	J, D-2	mg/L	1.0	8/12/11 8:45	8/15/11 14:14	EPA 365.1



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Classical/Nutrient Analyses

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0051

Lab ID: E113108-18

Station ID: INFL

Matrix: Wastewater

Date Collected: 7/27/11 13:13

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	29		mg/L	0.50	8/09/11 9:28	8/11/11 14:43	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	39		mg/L	1.0	8/10/11 12:16	8/10/11 12:16	EPA 351.2
E701177	Nitrate/Nitrite as N	0.050	U	mg/L	0.050	8/24/11 18:16	8/24/11 18:16	EPA 353.2
7723-14-0	Total Phosphorus	8.6		mg/L	1.0	8/12/11 8:45	8/15/11 14:14	EPA 365.1



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D.A.R.T. Id: 11-0591

Project: 11-0591, Hattiesburg South Lagoon CSI - Reported by Jenny Scifres

Classical/Nutrient Analyses

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0033

Lab ID: E113108-19

Station ID: INTERNAL PROCESS SAMPLE

Matrix: Municipal Proc. Wastewater

Date Collected: 7/27/11 11:33

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1640606	BOD, 5 Day	100	A	mg/L	2.0	7/29/11 9:55	7/29/11 9:55	SM 5210B
E1642818	Total Suspended Solids	390		mg/L	4.0	8/03/11 21:10	8/03/11 21:10	SM 2540D



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Classical/Nutrient Analyses

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0052

Lab ID: E113108-20

Station ID: INTERNAL PROCESS SAMPLE

Matrix: Municipal Proc. Wastewater

Date Collected: 7/27/11 11:11

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1640606	BOD, 5 Day	93	A	mg/L	2.0	7/29/11 9:42	7/29/11 9:42	SM 5210B
E1642818	Total Suspended Solids	190		mg/L	4.0	8/03/11 21:10	8/03/11 21:10	SM 2540D



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Classical/Nutrient Analyses

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0053

Lab ID: E113108-21

Station ID: INTERNAL PROCESS SAMPLE

Matrix: Municipal Proc. Wastewater

Date Collected: 7/27/11 11:43

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1640606	BOD, 5 Day	62	A	mg/L	2.0	7/29/11 10:06	7/29/11 10:06	SM 5210B
E1642818	Total Suspended Solids	100		mg/L	4.0	8/03/11 21:10	8/03/11 21:10	SM 2540D



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Classical/Nutrient Analyses

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0012

Lab ID: E113108-22

Station ID: PRETRT

Matrix: Wastewater

Date Collected: 7/27/11 16:05

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	26		mg/L	1.0	8/09/11 9:28	8/11/11 14:43	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	250	CR, D-2	mg/L	5.0	8/10/11 12:16	8/10/11 12:16	EPA 351.2
E1640606	BOD, 5 Day	300	L	mg/L	2.0	7/29/11 13:20	7/29/11 13:20	SM 5210B
E701177	Nitrate/Nitrite as N	1.6		mg/L	0.050	8/24/11 18:16	8/24/11 18:16	EPA 353.2
7723-14-0	Total Phosphorus	17	J, D-2	mg/L	1.0	8/12/11 8:45	8/15/11 14:14	EPA 365.1
E1642818	Total Suspended Solids	640		mg/L	4.0	8/03/11 21:10	8/03/11 21:10	SM 2540D



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Classical/Nutrient Analyses

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0023

Lab ID: E113108-23

Station ID: UPSTRM

Matrix: Surface Water

Date Collected: 7/27/11 9:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
E1640606	BOD, 5 Day	4.0	K	mg/L	2.0	7/29/11 8:59	7/29/11 8:59	SM 5210B
E1642818	Total Suspended Solids	26		mg/L	4.0	8/03/11 21:10	8/03/11 21:10	SM 2540D



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Classical/Nutrient Analyses

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0025

Lab ID: E113108-24

Station ID: UPSTRM

Matrix: Surface Water

Date Collected: 7/27/11 9:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7664-41-7	Ammonia as N	0.11		mg/L	0.050	8/09/11 9:28	8/11/11 14:43	EPA 350.1
E17148461	Total Kjeldahl Nitrogen	0.69	J, QM-I	mg/L	0.050	8/10/11 12:16	8/10/11 12:16	EPA 351.2
E701177	Nitrate/Nitrite as N	0.44		mg/L	0.050	8/24/11 18:16	8/24/11 18:16	EPA 353.2
7723-14-0	Total Phosphorus	0.16		mg/L	0.010	8/12/11 8:45	8/15/11 14:14	EPA 365.1



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D.A.R.T. Id: 11-0591

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Classical/Nutrient Analyses (CNA) - Quality Control
US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1108014 - C 2540 Solids										
Blank (1108014-BLK1)				Prepared & Analyzed: 08/03/11						
SM 2540D										
Total Suspended Solids	U	4.0	mg/L							U
LCS (1108014-BS1)				Prepared & Analyzed: 08/03/11						
SM 2540D										
Total Suspended Solids	98.800	4.0	mg/L	96.600		102	83-109			
LCS Dup (1108014-BSD1)				Prepared & Analyzed: 08/03/11						
SM 2540D										
Total Suspended Solids	97.600	4.0	mg/L	96.600		101	83-109	1.22	10	
Duplicate (1108014-DUP1)				Source: E113108-23		Prepared & Analyzed: 08/03/11				
SM 2540D										
Total Suspended Solids	26.800	4.0	mg/L		26.100			2.65	10	
Duplicate (1108014-DUP2)				Source: E113109-13		Prepared & Analyzed: 08/03/11				
SM 2540D										
Total Suspended Solids	61.200	4.0	mg/L		60.600			0.985	10	
MRL Verification (1108014-PS1)				Prepared & Analyzed: 08/03/11						
SM 2540D										
Total Suspended Solids	3.3000	4.0	mg/L	4.8300		68.3	63-129			MRL-2, U
Batch 1108028 - C SM5210 BOD										
Blank (1108028-BLK1)				Prepared & Analyzed: 07/29/11						
SM 5210B										
BOD, 5 Day	U	2.0	mg/L							U
LCS (1108028-BS1)				Prepared & Analyzed: 07/29/11						
SM 5210B										
BOD, 5 Day	196.00	2.0	mg/L	195.00		101	79-133			
LCS Dup (1108028-BSD1)				Prepared & Analyzed: 07/29/11						
SM 5210B										
BOD, 5 Day	198.50	2.0	mg/L	195.00		102	79-133	1.27	10	



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D.A.R.T. Id: 11-0591

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Classical/Nutrient Analyses (CNA) - Quality Control
 US-EPA, Region 4, SEDS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1108028 - C SM5210 BOD										
Duplicate (1108028-DUP1)		Source: E113108-12		Prepared & Analyzed: 07/29/11						
SM 5210B										
BOD, 5 Day	317.00	2.0	mg/L		336.00			5.82	20	
Batch 1108043 - C 350.1 Ammonia										
Blank (1108043-BLK1)		Prepared: 08/09/11 Analyzed: 08/11/11								
EPA 350.1										
Ammonia as N	U	0.050	mg/L							U
LCS (1108043-BS1)		Prepared: 08/09/11 Analyzed: 08/11/11								
EPA 350.1										
Ammonia as N	0.91620	0.050	mg/L	1.0000		91.6	90-110			
LCS Dup (1108043-BSD1)		Prepared: 08/09/11 Analyzed: 08/11/11								
EPA 350.1										
Ammonia as N	0.91220	0.050	mg/L	1.0000		91.2	90-110	0.438	10	
Matrix Spike (1108043-MS1)		Source: E113108-24		Prepared: 08/09/11 Analyzed: 08/11/11						
EPA 350.1										
Ammonia as N	1.0390	0.050	mg/L	1.0000	0.10960	92.9	90-110			
Matrix Spike (1108043-MS2)		Source: E113109-12		Prepared: 08/09/11 Analyzed: 08/11/11						
EPA 350.1										
Ammonia as N	1.0157	0.050	mg/L	1.0000	0.080700	93.5	90-110			
Matrix Spike Dup (1108043-MSD1)		Source: E113108-24		Prepared: 08/09/11 Analyzed: 08/11/11						
EPA 350.1										
Ammonia as N	1.0431	0.050	mg/L	1.0000	0.10960	93.4	90-110	0.440	10	
Matrix Spike Dup (1108043-MSD2)		Source: E113109-12		Prepared: 08/09/11 Analyzed: 08/11/11						
EPA 350.1										
Ammonia as N	1.0393	0.050	mg/L	1.0000	0.080700	95.9	90-110	2.49	10	
MRL Verification (1108043-PS1)		Prepared: 08/09/11 Analyzed: 08/11/11								
EPA 350.1										
Ammonia as N	0.035500	0.050	mg/L	0.050000		71.0	70-130			MRL-2, U



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D.A.R.T. Id: 11-0591

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Classical/Nutrient Analyses (CNA) - Quality Control

US-EPA, Region 4, SEDS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1108043 - C 350.1 Ammonia										
MRL Verification (1108043-PS1)				Prepared: 08/09/11 Analyzed: 08/11/11						
Batch 1108052 - C 351.2 TKN										
Blank (1108052-BLK1)				Prepared & Analyzed: 08/10/11						
EPA 351.2										
Total Kjeldahl Nitrogen	U	0.050	mg/L							U
LCS (1108052-BS1)				Prepared & Analyzed: 08/10/11						
EPA 351.2										
Total Kjeldahl Nitrogen	2.3735	0.050	mg/L	2.3400		101	90-110			
LCS Dup (1108052-BSD1)				Prepared & Analyzed: 08/10/11						
EPA 351.2										
Total Kjeldahl Nitrogen	2.3686	0.050	mg/L	2.3400		101	90-110	0.207	15	
Matrix Spike (1108052-MS1)				Source: E113108-24RE1	Prepared & Analyzed: 08/10/11					
EPA 351.2										
Total Kjeldahl Nitrogen	1.5485	0.050	mg/L	1.0000	0.69440	85.4	90-110			QM-1
Matrix Spike (1108052-MS2)				Source: E113109-12RE1	Prepared & Analyzed: 08/10/11					
EPA 351.2										
Total Kjeldahl Nitrogen	1.9853	0.050	mg/L	1.0000	0.75760	123	90-110			QM-2
Matrix Spike Dup (1108052-MSD1)				Source: E113108-24RE1	Prepared & Analyzed: 08/10/11					
EPA 351.2										
Total Kjeldahl Nitrogen	1.6120	0.050	mg/L	1.0000	0.69440	91.8	90-110	7.17	20	
Matrix Spike Dup (1108052-MSD2)				Source: E113109-12RE1	Prepared & Analyzed: 08/10/11					
EPA 351.2										
Total Kjeldahl Nitrogen	1.9482	0.050	mg/L	1.0000	0.75760	119	90-110	3.07	20	QM-2
MRL Verification (1108052-PS1)				Prepared & Analyzed: 08/10/11						
EPA 351.2										
Total Kjeldahl Nitrogen	0.029300	0.050	mg/L	0.050000		58.6	70-130			MRL-2, QR-1, U



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Classical/Nutrient Analyses (CNA) - Quality Control
 US-EPA, Region 4, SEDS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1108061 - C 365.1 TPhos										
Blank (1108061-BLK1)				Prepared: 08/12/11 Analyzed: 08/15/11						
EPA 365.1										
Total Phosphorus	U	0.010	mg/L							U
Blank (1108061-BLK2)				Prepared: 08/12/11 Analyzed: 08/15/11						
EPA 365.1										
Total Phosphorus	U	0.010	mg/L							U
LCS (1108061-BS1)				Prepared: 08/12/11 Analyzed: 08/15/11						
EPA 365.1										
Total Phosphorus	0.41110	0.010	mg/L	0.40750		101	90-110			
LCS (1108061-BS2)				Prepared: 08/12/11 Analyzed: 08/15/11						
EPA 365.1										
Total Phosphorus	0.40860	0.010	mg/L	0.40750		100	90-110			
LCS Dup (1108061-BSD1)				Prepared: 08/12/11 Analyzed: 08/15/11						
EPA 365.1										
Total Phosphorus	0.39830	0.010	mg/L	0.40750		97.7	90-110	3.16	10	
LCS Dup (1108061-BSD2)				Prepared: 08/12/11 Analyzed: 08/15/11						
EPA 365.1										
Total Phosphorus	0.40740	0.010	mg/L	0.40750		100	90-110	0.294	10	
Matrix Spike (1108061-MS1)				Source: E113103-38RE1		Prepared: 08/12/11 Analyzed: 08/15/11				
EPA 365.1										
Total Phosphorus	0.56900	0.010	mg/L	0.50000	0.061700	101	90-110			
Matrix Spike (1108061-MS2)				Source: E113202-07		Prepared: 08/12/11 Analyzed: 08/15/11				
EPA 365.1										
Total Phosphorus	0.56330	0.010	mg/L	0.50000	0.055500	102	90-110			
Matrix Spike (1108061-MS3)				Source: E113108-24		Prepared: 08/12/11 Analyzed: 08/15/11				
EPA 365.1										
Total Phosphorus	0.65050	0.010	mg/L	0.50000	0.15510	99.1	90-110			
Matrix Spike (1108061-MS4)				Source: E113109-12		Prepared: 08/12/11 Analyzed: 08/15/11				



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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D.A.R.T. Id: 11-0591

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Classical/Nutrient Analyses (CNA) - Quality Control
US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1108061 - C 365.1 TPhos										
Matrix Spike (1108061-MS4) Source: E113109-12 Prepared: 08/12/11 Analyzed: 08/15/11										
EPA 365.1										
Total Phosphorus	0.68670	0.010	mg/L	0.50000	0.20450	96.4	90-110			
Matrix Spike Dup (1108061-MSD1) Source: E113103-38RE1 Prepared: 08/12/11 Analyzed: 08/15/11										
EPA 365.1										
Total Phosphorus	0.57590	0.010	mg/L	0.50000	0.061700	103	90-110	1.35	10	
Matrix Spike Dup (1108061-MSD2) Source: E113202-07 Prepared: 08/12/11 Analyzed: 08/15/11										
EPA 365.1										
Total Phosphorus	0.56650	0.010	mg/L	0.50000	0.055500	102	90-110	0.628	10	
Matrix Spike Dup (1108061-MSD3) Source: E113108-24 Prepared: 08/12/11 Analyzed: 08/15/11										
EPA 365.1										
Total Phosphorus	0.64850	0.010	mg/L	0.50000	0.15510	98.7	90-110	0.405	10	
Matrix Spike Dup (1108061-MSD4) Source: E113109-12 Prepared: 08/12/11 Analyzed: 08/15/11										
EPA 365.1										
Total Phosphorus	0.68550	0.010	mg/L	0.50000	0.20450	96.2	90-110	0.249	10	
MRL Verification (1108061-PS1) Prepared: 08/12/11 Analyzed: 08/15/11										
EPA 365.1										
Total Phosphorus	0.0056000	0.010	mg/L	0.010000		56.0	70-130			MRL-2, QR-1, U
Batch 1108133 - C 353.2 NO3-NO2										
Blank (1108133-BLK1) Prepared & Analyzed: 08/24/11										
EPA 353.2										
Nitrate/Nitrite as N	U	0.050	mg/L							U
LCS (1108133-BS1) Prepared & Analyzed: 08/24/11										
EPA 353.2										
Nitrate/Nitrite as N	0.47380	0.050	mg/L	0.50000		94.8	90-110			
LCS Dup (1108133-BSD1) Prepared & Analyzed: 08/24/11										
EPA 353.2										
Nitrate/Nitrite as N	0.49020	0.050	mg/L	0.50000		98.0	90-110	3.40	10	



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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D.A.R.T. Id: 11-0591

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Classical/Nutrient Analyses (CNA) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1108133 - C 353.2 NO3-NO2										
Matrix Spike (1108133-MS1)		Source: E113108-24			Prepared & Analyzed: 08/24/11					
EPA 353.2										
Nitrate/Nitrite as N	0.93880	0.050	mg/L	0.50000	0.44340	99.1	90-110			
Matrix Spike Dup (1108133-MSD1)		Source: E113108-24			Prepared & Analyzed: 08/24/11					
EPA 353.2										
Nitrate/Nitrite as N	0.94930	0.050	mg/L	0.50000	0.44340	101	90-110	2.10	10	
MRL Verification (1108133-PS1)		Prepared & Analyzed: 08/24/11								
EPA 353.2										
Nitrate/Nitrite as N	0.048800	0.050	mg/L	0.050000		97.6	70-130			MRL-2,



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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980 College Station Road, Athens, Georgia 30605-2700

D.A.R.T. Id: 11-0591

Project: 11-0591, Hattiesburg South Lagoon CSI - Reported by Jenny Scifres

Notes and Definitions for QC Samples

- U The analyte was not detected at or above the reporting limit.
- MRL-2 MRL verification for Non-Potable Water matrix
- QM-1 Matrix Spike Recovery less than method control limits
- QM-2 Matrix Spike Recovery greater than method control limits
- QR-1 MRL verification recovery less than lower control limits.



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September 1, 2011

4SESD-ASB

MEMORANDUM

SUBJECT: FINAL Analytical Report
 Project: 11-0591, Hattiesburg South Lagoon CSI
 Compliance Monitoring

FROM: Jenny Scifres
 ASB Inorganic Chemistry Section Chief

THRU: Gary Bennett, Chief
 Analytical Support Branch

TO: Richard Elliott

Attached are the final results for the analytical groups listed below. These analyses were performed in accordance with the Analytical Support Branch's (ASB) Laboratory Operations and Quality Assurance Manual (ASB LOQAM) found at www.epa.gov/region4/sesd/asbsop. Any unique project data quality objectives specified in writing by the data requestor have also been incorporated into the data unless otherwise noted in the Report Narrative. Chemistry data have been verified based on the ASB LOQAM specifications and may have been qualified if the applicable quality control criteria were not met. For a listing of specific data qualifiers and explanations, please refer to the Data Qualifier Definitions included in this report. The reported results are accurate within the limits of the method(s) and are representative only of the samples as received by the laboratory.

Analyses Included in this report:

Method Used:

Total Metals (TMTL)

Total Mercury	EPA 245.1
Total Metals	EPA 200.7
Total Metals	EPA 200.8



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

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D.A.R.T. Id: 11-0591

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Sample Disposal Policy

Because of the laboratory's limited space for long term sample storage, our policy is to dispose of samples on a periodic schedule. Please note that within 60 days of this memo, the original samples and all sample extracts and/or sample digestates will be disposed of in accordance with applicable regulations. The 60-day sample disposal policy does not apply to criminal samples which are held until the laboratory is notified by the criminal investigators that case development and litigation are complete.

These samples may be held in the laboratory's custody for a longer period of time if you have a special project need. If you wish for the laboratory to hold samples beyond the 60-day period, please contact our Sample Control Coordinator, Debbie Colquitt, by e-mail at Colquitt.Debbie@epa.gov, and provide a reason for holding samples beyond 60 days



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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D.A.R.T. Id: 11-0591

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SAMPLES INCLUDED IN THIS REPORT

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID	Laboratory ID	Matrix	Date Collected	Date Received
HTSO-0002	E113108-02	Preservative Blank	7/27/11 16:35	7/29/11 9:01
HTSO-0005	E113108-03	Rinse Water Blank	7/27/11 13:56	7/29/11 9:01
HTSO-0029	E113108-04	Rinse Water Blank	7/27/11 11:30	7/29/11 9:01
HTSO-0019	E113108-08	Municipal Eff. Wastewater	7/27/11 14:02	7/29/11 9:01
HTSO-0046	E113108-13	Wastewater	7/27/11 14:17	7/29/11 9:01
HTSO-0047	E113108-14	Wastewater	7/27/11 13:31	7/29/11 9:01
HTSO-0048	E113108-15	Wastewater	7/27/11 13:13	7/29/11 9:01



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Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700

D.A.R.T. Id: 11-0591

Project: 11-0591, Hattiesburg South Lagoon CSI - Reported by Jenny Scifres

DATA QUALIFIER DEFINITIONS

U	The analyte was not detected at or above the reporting limit.
D-4	MRL elevated due to interferences.
J	The identification of the analyte is acceptable; the reported value is an estimate.
QC-5	Calibration check standard less than method control limits.

ACRONYMS AND ABBREVIATIONS

CAS	Chemical Abstracts Service Note: Analytes with no known CAS identifiers have been assigned codes beginning with "E", the EPA ID as assigned by the EPA Substance Registry System (www.epa.gov/srs), or beginning with "R4-", a unique identifier assigned by the EPA Region 4 laboratory.
MDL	Method Detection Limit - The minimum concentration of a substance (an analyte) that can be measured and reported with a 99% confidence that the analyte concentration is greater than zero.
MRL	Minimum Reporting Limit - Analyte concentration that corresponds to the lowest demonstrated level of acceptable quantitation. The MRL is sample-specific and accounts for preparation weights and volumes, dilutions, and moisture content of soil/sediments.
TIC	Tentatively Identified Compound - An analyte identified based on a match with the instrument software's mass spectral library. A calibration standard has not been analyzed to confirm the compound's identification or the estimated concentration reported.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 4 Science and Ecosystem Support Division

980 College Station Road, Athens, Georgia 30605-2700

D.A.R.T. Id: 11-0591

Project: 11-0591, Hattiesburg South Lagoon CSI - Reported by Jenny Scifres

Total Metals

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0002

Lab ID: E113108-02

Station ID:

Matrix: Preservative Blank

Date Collected: 7/27/11 16:35

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7439-97-6	Mercury	0.10	U	ug/L	0.10	8/23/11 8:50	8/23/11 13:41	EPA 245.1
7429-90-5	Aluminum	100	U	ug/L	100	8/03/11 15:17	8/10/11 15:51	EPA 200.7
7440-36-0	Antimony	1.0	U	ug/L	1.0	8/03/11 15:47	8/11/11 17:43	EPA 200.8
7440-38-2	Arsenic	1.0	U	ug/L	1.0	8/03/11 15:47	8/11/11 17:43	EPA 200.8
7440-39-3	Barium	5.0	U, J, QC-5	ug/L	5.0	8/03/11 15:17	8/10/11 15:51	EPA 200.7
7440-41-7	Beryllium	3.0	U	ug/L	3.0	8/03/11 15:17	8/10/11 15:51	EPA 200.7
7440-43-9	Cadmium	0.50	U	ug/L	0.50	8/03/11 15:47	8/11/11 17:43	EPA 200.8
7440-70-2	Calcium	250	U	ug/L	250	8/03/11 15:17	8/10/11 15:51	EPA 200.7
7440-47-3	Chromium	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 15:51	EPA 200.7
7440-48-4	Cobalt	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 15:51	EPA 200.7
7440-50-8	Copper	10	U	ug/L	10	8/03/11 15:17	8/10/11 15:51	EPA 200.7
7439-89-6	Iron	100	U	ug/L	100	8/03/11 15:17	8/10/11 15:51	EPA 200.7
7439-92-1	Lead	1.0	U	ug/L	1.0	8/03/11 15:47	8/11/11 17:43	EPA 200.8
7439-95-4	Magnesium	250	U	ug/L	250	8/03/11 15:17	8/10/11 15:51	EPA 200.7
7439-96-5	Manganese	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 15:51	EPA 200.7
7439-98-7	Molybdenum	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 15:51	EPA 200.7
7440-02-0	Nickel	10	U	ug/L	10	8/03/11 15:17	8/10/11 15:51	EPA 200.7
7440-09-7	Potassium	1000	U	ug/L	1000	8/03/11 15:17	8/10/11 15:51	EPA 200.7
7782-49-2	Selenium	2.0	U	ug/L	2.0	8/03/11 15:47	8/11/11 17:43	EPA 200.8
7440-22-4	Silver	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 15:51	EPA 200.7
7440-23-5	Sodium	1000	U	ug/L	1000	8/03/11 15:17	8/10/11 15:51	EPA 200.7
7440-24-6	Strontium	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 15:51	EPA 200.7
7440-28-0	Thallium	1.0	U	ug/L	1.0	8/03/11 15:47	8/11/11 17:43	EPA 200.8
7440-31-5	Tin	15	U	ug/L	15	8/03/11 15:17	8/10/11 15:51	EPA 200.7
7440-32-6	Titanium	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 15:51	EPA 200.7
7440-62-2	Vanadium	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 15:51	EPA 200.7
7440-65-5	Yttrium	3.0	U	ug/L	3.0	8/03/11 15:17	8/10/11 15:51	EPA 200.7
7440-66-6	Zinc	10	U	ug/L	10	8/03/11 15:17	8/10/11 15:51	EPA 200.7



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 4 Science and Ecosystem Support Division

980 College Station Road, Athens, Georgia 30605-2700

D.A.R.T. Id: 11-0591

Project: 11-0591, Hattiesburg South Lagoon CSI - Reported by Jenny Scifres

Total Metals

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0005

Lab ID: E113108-03

Station ID:

Matrix: Rinse Water Blank

Date Collected: 7/27/11 13:56

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7439-97-6	Mercury	0.10	U	ug/L	0.10	8/23/11 8:50	8/23/11 13:41	EPA 245.1
7429-90-5	Aluminum	100	U	ug/L	100	8/03/11 15:17	8/10/11 15:56	EPA 200.7
7440-36-0	Antimony	1.0	U	ug/L	1.0	8/03/11 15:47	8/11/11 18:02	EPA 200.8
7440-38-2	Arsenic	1.0	U	ug/L	1.0	8/03/11 15:47	8/11/11 18:02	EPA 200.8
7440-39-3	Barium	5.0	U, J, QC-5	ug/L	5.0	8/03/11 15:17	8/10/11 15:56	EPA 200.7
7440-41-7	Beryllium	3.0	U	ug/L	3.0	8/03/11 15:17	8/10/11 15:56	EPA 200.7
7440-43-9	Cadmium	0.50	U	ug/L	0.50	8/03/11 15:47	8/11/11 18:02	EPA 200.8
7440-70-2	Calcium	250	U	ug/L	250	8/03/11 15:17	8/10/11 15:56	EPA 200.7
7440-47-3	Chromium	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 15:56	EPA 200.7
7440-48-4	Cobalt	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 15:56	EPA 200.7
7440-50-8	Copper	10	U	ug/L	10	8/03/11 15:17	8/10/11 15:56	EPA 200.7
7439-89-6	Iron	100	U	ug/L	100	8/03/11 15:17	8/10/11 15:56	EPA 200.7
7439-92-1	Lead	1.0	U	ug/L	1.0	8/03/11 15:47	8/11/11 18:02	EPA 200.8
7439-95-4	Magnesium	250	U	ug/L	250	8/03/11 15:17	8/10/11 15:56	EPA 200.7
7439-96-5	Manganese	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 15:56	EPA 200.7
7439-98-7	Molybdenum	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 15:56	EPA 200.7
7440-02-0	Nickel	10	U	ug/L	10	8/03/11 15:17	8/10/11 15:56	EPA 200.7
7440-09-7	Potassium	1000	U	ug/L	1000	8/03/11 15:17	8/10/11 15:56	EPA 200.7
7782-49-2	Selenium	2.0	U	ug/L	2.0	8/03/11 15:47	8/11/11 18:02	EPA 200.8
7440-22-4	Silver	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 15:56	EPA 200.7
7440-23-5	Sodium	1000	U	ug/L	1000	8/03/11 15:17	8/10/11 15:56	EPA 200.7
7440-24-6	Strontium	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 15:56	EPA 200.7
7440-28-0	Thallium	1.0	U	ug/L	1.0	8/03/11 15:47	8/11/11 18:02	EPA 200.8
7440-31-5	Tin	15	U	ug/L	15	8/03/11 15:17	8/10/11 15:56	EPA 200.7
7440-32-6	Titanium	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 15:56	EPA 200.7
7440-62-2	Vanadium	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 15:56	EPA 200.7
7440-65-5	Yttrium	3.0	U	ug/L	3.0	8/03/11 15:17	8/10/11 15:56	EPA 200.7
7440-66-6	Zinc	10	U	ug/L	10	8/03/11 15:17	8/10/11 15:56	EPA 200.7



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 4 Science and Ecosystem Support Division

980 College Station Road, Athens, Georgia 30605-2700

D.A.R.T. Id: 11-0591

Project: 11-0591, Hattiesburg South Lagoon CSI - Reported by Jenny Scifres

Total Metals

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0029

Lab ID: E113108-04

Station ID:

Matrix: Rinse Water Blank

Date Collected: 7/27/11 11:30

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7439-97-6	Mercury	0.10	U	ug/L	0.10	8/23/11 8:50	8/23/11 13:41	EPA 245.1
7429-90-5	Aluminum	100	U	ug/L	100	8/03/11 15:17	8/10/11 16:43	EPA 200.7
7440-36-0	Antimony	1.0	U	ug/L	1.0	8/03/11 15:47	8/11/11 18:11	EPA 200.8
7440-38-2	Arsenic	1.0	U	ug/L	1.0	8/03/11 15:47	8/11/11 18:11	EPA 200.8
7440-39-3	Barium	5.0	U, J, QC-5	ug/L	5.0	8/03/11 15:17	8/10/11 16:43	EPA 200.7
7440-41-7	Beryllium	3.0	U	ug/L	3.0	8/03/11 15:17	8/10/11 16:43	EPA 200.7
7440-43-9	Cadmium	0.50	U	ug/L	0.50	8/03/11 15:47	8/11/11 18:11	EPA 200.8
7440-70-2	Calcium	250	U	ug/L	250	8/03/11 15:17	8/10/11 16:43	EPA 200.7
7440-47-3	Chromium	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 16:43	EPA 200.7
7440-48-4	Cobalt	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 16:43	EPA 200.7
7440-50-8	Copper	10	U	ug/L	10	8/03/11 15:17	8/10/11 16:43	EPA 200.7
7439-89-6	Iron	100	U	ug/L	100	8/03/11 15:17	8/10/11 16:43	EPA 200.7
7439-92-1	Lead	1.0	U	ug/L	1.0	8/03/11 15:47	8/11/11 18:11	EPA 200.8
7439-95-4	Magnesium	250	U	ug/L	250	8/03/11 15:17	8/10/11 16:43	EPA 200.7
7439-96-5	Manganese	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 16:43	EPA 200.7
7439-98-7	Molybdenum	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 16:43	EPA 200.7
7440-02-0	Nickel	10	U	ug/L	10	8/03/11 15:17	8/10/11 16:43	EPA 200.7
7440-09-7	Potassium	1000	U	ug/L	1000	8/03/11 15:17	8/10/11 16:43	EPA 200.7
7782-49-2	Selenium	2.0	U	ug/L	2.0	8/03/11 15:47	8/11/11 18:11	EPA 200.8
7440-22-4	Silver	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 16:43	EPA 200.7
7440-23-5	Sodium	1000	U	ug/L	1000	8/03/11 15:17	8/10/11 16:43	EPA 200.7
7440-24-6	Strontium	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 16:43	EPA 200.7
7440-28-0	Thallium	1.0	U	ug/L	1.0	8/03/11 15:47	8/11/11 18:11	EPA 200.8
7440-31-5	Tin	15	U	ug/L	15	8/03/11 15:17	8/10/11 16:43	EPA 200.7
7440-32-6	Titanium	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 16:43	EPA 200.7
7440-62-2	Vanadium	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 16:43	EPA 200.7
7440-65-5	Yttrium	3.0	U	ug/L	3.0	8/03/11 15:17	8/10/11 16:43	EPA 200.7
7440-66-6	Zinc	33		ug/L	10	8/03/11 15:17	8/10/11 16:43	EPA 200.7



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700

D.A.R.T. Id: 11-0591

Project: 11-0591, Hattiesburg South Lagoon CSI - Reported by Jenny Scifres

Total Metals

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0019

Lab ID: E113108-08

Station ID: EFF001

Matrix: Municipal Eff. Wastewater

Date Collected: 7/27/11 14:02

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7439-97-6	Mercury	0.10	U	ug/L	0.10	8/23/11 8:50	8/23/11 13:41	EPA 245.1
7429-90-5	Aluminum	500	U	ug/L	500	8/03/11 15:17	8/10/11 16:48	EPA 200.7
7440-36-0	Antimony	5.0	U	ug/L	5.0	8/03/11 15:47	8/11/11 18:21	EPA 200.8
7440-38-2	Arsenic	5.0	U	ug/L	5.0	8/03/11 15:47	8/11/11 18:21	EPA 200.8
7440-39-3	Barium	70 J, QC-5		ug/L	25	8/03/11 15:17	8/10/11 16:48	EPA 200.7
7440-41-7	Beryllium	15	U	ug/L	15	8/03/11 15:17	8/10/11 16:48	EPA 200.7
7440-43-9	Cadmium	2.5	U	ug/L	2.5	8/03/11 15:47	8/11/11 18:21	EPA 200.8
7440-70-2	Calcium	53000		ug/L	1200	8/03/11 15:17	8/10/11 16:48	EPA 200.7
7440-47-3	Chromium	25	U	ug/L	25	8/03/11 15:17	8/10/11 16:48	EPA 200.7
7440-48-4	Cobalt	25	U	ug/L	25	8/03/11 15:17	8/10/11 16:48	EPA 200.7
7440-50-8	Copper	50	U	ug/L	50	8/03/11 15:17	8/10/11 16:48	EPA 200.7
7439-89-6	Iron	620		ug/L	500	8/03/11 15:17	8/10/11 16:48	EPA 200.7
7439-92-1	Lead	5.0	U	ug/L	5.0	8/03/11 15:47	8/11/11 18:21	EPA 200.8
7439-95-4	Magnesium	18000		ug/L	1200	8/03/11 15:17	8/10/11 16:48	EPA 200.7
7439-96-5	Manganese	180		ug/L	25	8/03/11 15:17	8/10/11 16:48	EPA 200.7
7439-98-7	Molybdenum	25	U	ug/L	25	8/03/11 15:17	8/10/11 16:48	EPA 200.7
7440-02-0	Nickel	50	U	ug/L	50	8/03/11 15:17	8/10/11 16:48	EPA 200.7
7440-09-7	Potassium	150000		ug/L	5000	8/03/11 15:17	8/10/11 16:48	EPA 200.7
7782-49-2	Selenium	15 U, J, D-4		ug/L	15	8/03/11 15:47	8/11/11 18:21	EPA 200.8
7440-22-4	Silver	25	U	ug/L	25	8/03/11 15:17	8/10/11 16:48	EPA 200.7
7440-23-5	Sodium	95000		ug/L	5000	8/03/11 15:17	8/10/11 16:48	EPA 200.7
7440-24-6	Strontium	240		ug/L	25	8/03/11 15:17	8/10/11 16:48	EPA 200.7
7440-28-0	Thallium	5.0	U	ug/L	5.0	8/03/11 15:47	8/11/11 18:21	EPA 200.8
7440-31-5	Tin	75	U	ug/L	75	8/03/11 15:17	8/10/11 16:48	EPA 200.7
7440-32-6	Titanium	25	U	ug/L	25	8/03/11 15:17	8/10/11 16:48	EPA 200.7
7440-62-2	Vanadium	25	U	ug/L	25	8/03/11 15:17	8/10/11 16:48	EPA 200.7
7440-65-5	Yttrium	15	U	ug/L	15	8/03/11 15:17	8/10/11 16:48	EPA 200.7
7440-66-6	Zinc	50	U	ug/L	50	8/03/11 15:17	8/10/11 16:48	EPA 200.7



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
 Region 4 Science and Ecosystem Support Division
 980 College Station Road, Athens, Georgia 30605-2700

D.A.R.T. Id: 11-0591

Project: 11-0591, Hattiesburg South Lagoon CSI - Reported by Jenny Scifres

Total Metals

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0046

Lab ID: E113108-13

Station ID: INFL

Matrix: Wastewater

Date Collected: 7/27/11 14:17

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7439-97-6	Mercury	0.10	U	ug/L	0.10	8/23/11 8:30	8/23/11 13:41	EPA 245.1
7429-90-5	Aluminum	970		ug/L	100	8/03/11 15:17	8/10/11 16:54	EPA 200.7
7440-36-0	Antimony	1.0	U	ug/L	1.0	8/03/11 15:47	8/11/11 18:30	EPA 200.8
7440-38-2	Arsenic	1.0		ug/L	1.0	8/03/11 15:47	8/11/11 18:30	EPA 200.8
7440-39-3	Barium	65 J, QC-5		ug/L	5.0	8/03/11 15:17	8/10/11 16:54	EPA 200.7
7440-41-7	Beryllium	3.0	U	ug/L	3.0	8/03/11 15:17	8/10/11 16:54	EPA 200.7
7440-43-9	Cadmium	0.50	U	ug/L	0.50	8/03/11 15:47	8/11/11 18:30	EPA 200.8
7440-70-2	Calcium	14000		ug/L	250	8/03/11 15:17	8/10/11 16:54	EPA 200.7
7440-47-3	Chromium	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 16:54	EPA 200.7
7440-48-4	Cobalt	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 16:54	EPA 200.7
7440-50-8	Copper	20		ug/L	10	8/03/11 15:17	8/10/11 16:54	EPA 200.7
7439-89-6	Iron	1600		ug/L	100	8/03/11 15:17	8/10/11 16:54	EPA 200.7
7439-92-1	Lead	7.3		ug/L	1.0	8/03/11 15:47	8/11/11 18:30	EPA 200.8
7439-95-4	Magnesium	3500		ug/L	250	8/03/11 15:17	8/10/11 16:54	EPA 200.7
7439-96-5	Manganese	100		ug/L	5.0	8/03/11 15:17	8/10/11 16:54	EPA 200.7
7439-98-7	Molybdenum	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 16:54	EPA 200.7
7440-02-0	Nickel	10	U	ug/L	10	8/03/11 15:17	8/10/11 16:54	EPA 200.7
7440-09-7	Potassium	8100	U	ug/L	8100	8/03/11 15:17	8/10/11 16:54	EPA 200.7
7782-49-2	Selenium	2.0	U	ug/L	2.0	8/03/11 15:47	8/11/11 18:30	EPA 200.8
7440-22-4	Silver	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 16:54	EPA 200.7
7440-23-5	Sodium	49000		ug/L	1000	8/03/11 15:17	8/10/11 16:54	EPA 200.7
7440-24-6	Strontium	140		ug/L	5.0	8/03/11 15:17	8/10/11 16:54	EPA 200.7
7440-28-0	Thallium	1.0	U	ug/L	1.0	8/03/11 15:47	8/11/11 18:30	EPA 200.8
7440-31-5	Tin	15	U	ug/L	15	8/03/11 15:17	8/10/11 16:54	EPA 200.7
7440-32-6	Titanium	5.8		ug/L	5.0	8/03/11 15:17	8/10/11 16:54	EPA 200.7
7440-62-2	Vanadium	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 16:54	EPA 200.7
7440-65-5	Yttrium	3.0	U	ug/L	3.0	8/03/11 15:17	8/10/11 16:54	EPA 200.7
7440-66-6	Zinc	61		ug/L	10	8/03/11 15:17	8/10/11 16:54	EPA 200.7



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700

D.A.R.T. Id: 11-0591

Project: 11-0591, Hattiesburg South Lagoon CSI - Reported by Jenny Scifres

Total Metals

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0047

Lab ID: E113108-14

Station ID: INFL

Matrix: Wastewater

Date Collected: 7/27/11 13:31

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7439-97-6	Mercury	0.10	U	ug/L	0.10	8/23/11 8:50	8/23/11 13:41	EPA 245.1
7429-90-5	Aluminum	1000		ug/L	500	8/03/11 15:17	8/10/11 16:59	EPA 200.7
7440-36-0	Antimony	5.0	U	ug/L	5.0	8/03/11 15:47	8/11/11 19:08	EPA 200.8
7440-38-2	Arsenic	5.0	U	ug/L	5.0	8/03/11 15:47	8/11/11 19:08	EPA 200.8
7440-39-3	Barium	260	J, QC-5	ug/L	25	8/03/11 15:17	8/10/11 16:59	EPA 200.7
7440-41-7	Beryllium	15	U	ug/L	15	8/03/11 15:17	8/10/11 16:59	EPA 200.7
7440-43-9	Cadmium	2.5	U	ug/L	2.5	8/03/11 15:47	8/11/11 19:08	EPA 200.8
7440-70-2	Calcium	340000		ug/L	1200	8/03/11 15:17	8/10/11 16:59	EPA 200.7
7440-47-3	Chromium	25	U	ug/L	25	8/03/11 15:17	8/10/11 16:59	EPA 200.7
7440-48-4	Cobalt	25	U	ug/L	25	8/03/11 15:17	8/10/11 16:59	EPA 200.7
7440-50-8	Copper	230		ug/L	50	8/03/11 15:17	8/10/11 16:59	EPA 200.7
7439-89-6	Iron	5900		ug/L	500	8/03/11 15:17	8/10/11 16:59	EPA 200.7
7439-92-1	Lead	5.0	U	ug/L	5.0	8/03/11 15:47	8/11/11 19:08	EPA 200.8
7439-95-4	Magnesium	130000		ug/L	1200	8/03/11 15:17	8/10/11 16:59	EPA 200.7
7439-96-5	Manganese	890		ug/L	25	8/03/11 15:17	8/10/11 16:59	EPA 200.7
7439-98-7	Molybdenum	34		ug/L	25	8/03/11 15:17	8/10/11 16:59	EPA 200.7
7440-02-0	Nickel	61		ug/L	50	8/03/11 15:17	8/10/11 16:59	EPA 200.7
7440-09-7	Potassium	1100000		ug/L	5000	8/03/11 15:17	8/10/11 16:59	EPA 200.7
7782-49-2	Selenium	75	U, J, D-4	ug/L	75	8/03/11 15:47	8/11/11 19:08	EPA 200.8
7440-22-4	Silver	25	U	ug/L	25	8/03/11 15:17	8/10/11 16:59	EPA 200.7
7440-23-5	Sodium	240000		ug/L	5000	8/03/11 15:17	8/10/11 16:59	EPA 200.7
7440-24-6	Strontium	940		ug/L	25	8/03/11 15:17	8/10/11 16:59	EPA 200.7
7440-28-0	Thallium	5.0	U	ug/L	5.0	8/03/11 15:47	8/11/11 19:08	EPA 200.8
7440-31-5	Tin	75	U	ug/L	75	8/03/11 15:17	8/10/11 16:59	EPA 200.7
7440-32-6	Titanium	30		ug/L	25	8/03/11 15:17	8/10/11 16:59	EPA 200.7
7440-62-2	Vanadium	25		ug/L	25	8/03/11 15:17	8/10/11 16:59	EPA 200.7
7440-65-5	Yttrium	15	U	ug/L	15	8/03/11 15:17	8/10/11 16:59	EPA 200.7
7440-66-6	Zinc	250		ug/L	50	8/03/11 15:17	8/10/11 16:59	EPA 200.7



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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980 College Station Road, Athens, Georgia 30605-2700

D.A.R.T. Id: 11-0591

Project: 11-0591, Hattiesburg South Lagoon CSI - Reported by Jenny Scifres

Total Metals

Project: 11-0591, Hattiesburg South Lagoon CSI

Sample ID: HTSO-0048

Lab ID: E113108-15

Station ID: INFL

Matrix: Wastewater

Date Collected: 7/27/11 13:13

CAS Number	Analyte	Results	Qualifiers	Units	MRL	Prepared	Analyzed	Method
7439-97-6	Mercury	0.10	U	ug/L	0.10	8/23/11 8:50	8/23/11 13:41	EPA 245.1
7429-90-5	Aluminum	630		ug/L	100	8/03/11 15:17	8/10/11 17:06	EPA 200.7
7440-36-0	Antimony	1.0	U	ug/L	1.0	8/03/11 15:47	8/11/11 19:17	EPA 200.8
7440-38-2	Arsenic	1.1		ug/L	1.0	8/03/11 15:47	8/11/11 19:17	EPA 200.8
7440-39-3	Barium	73	J, QC-5	ug/L	5.0	8/03/11 15:17	8/10/11 17:06	EPA 200.7
7440-41-7	Beryllium	3.0	U	ug/L	3.0	8/03/11 15:17	8/10/11 17:06	EPA 200.7
7440-43-9	Cadmium	0.50	U	ug/L	0.50	8/03/11 15:47	8/11/11 19:17	EPA 200.8
7440-70-2	Calcium	17000		ug/L	250	8/03/11 15:17	8/10/11 17:06	EPA 200.7
7440-47-3	Chromium	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 17:06	EPA 200.7
7440-48-4	Cobalt	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 17:06	EPA 200.7
7440-50-8	Copper	39		ug/L	10	8/03/11 15:17	8/10/11 17:06	EPA 200.7
7439-89-6	Iron	1600		ug/L	100	8/03/11 15:17	8/10/11 17:06	EPA 200.7
7439-92-1	Lead	1.0		ug/L	1.0	8/03/11 15:47	8/11/11 19:17	EPA 200.8
7439-95-4	Magnesium	5700		ug/L	250	8/03/11 15:17	8/10/11 17:06	EPA 200.7
7439-96-5	Manganese	120		ug/L	5.0	8/03/11 15:17	8/10/11 17:06	EPA 200.7
7439-98-7	Molybdenum	18		ug/L	5.0	8/03/11 15:17	8/10/11 17:06	EPA 200.7
7440-02-0	Nickel	10	U	ug/L	10	8/03/11 15:17	8/10/11 17:06	EPA 200.7
7440-09-7	Potassium	20000	U	ug/L	20000	8/03/11 15:17	8/10/11 17:06	EPA 200.7
7782-49-2	Selenium	2.0	U	ug/L	2.0	8/03/11 15:47	8/11/11 19:17	EPA 200.8
7440-22-4	Silver	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 17:06	EPA 200.7
7440-23-5	Sodium	110000		ug/L	1000	8/03/11 15:17	8/10/11 17:06	EPA 200.7
7440-24-6	Strontium	270		ug/L	5.0	8/03/11 15:17	8/10/11 17:06	EPA 200.7
7440-28-0	Thallium	1.0	U	ug/L	1.0	8/03/11 15:47	8/11/11 19:17	EPA 200.8
7440-31-5	Tin	15	U	ug/L	15	8/03/11 15:17	8/10/11 17:06	EPA 200.7
7440-32-6	Titanium	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 17:06	EPA 200.7
7440-62-2	Vanadium	5.0	U	ug/L	5.0	8/03/11 15:17	8/10/11 17:06	EPA 200.7
7440-65-5	Yttrium	3.0	U	ug/L	3.0	8/03/11 15:17	8/10/11 17:06	EPA 200.7
7440-66-6	Zinc	92		ug/L	10	8/03/11 15:17	8/10/11 17:06	EPA 200.7



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D.A.R.T. Id: 11-0591

Project: 11-0591, Hattiesburg South Lagoon CSI - Reported by Jenny Scifres

Total Metals (TMTL) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1108015 - M 200.2 Metals Water										
Blank (1108015-BLK1)				Prepared: 08/03/11 Analyzed: 08/10/11						
EPA 200.7										
Silver	U	5.0	ug/L							U
Arsenic	U	50	"							U
Barium	U	5.0	"							U
Beryllium	U	3.0	"							U
Boron	U	50	"							U
Cadmium	U	5.0	"							U
Cobalt	U	5.0	"							U
Chromium	U	5.0	"							U
Copper	U	10	"							U
Molybdenum	U	5.0	"							U
Nickel	U	10	"							U
Lead	U	20	"							U
Antimony	U	40	"							U
Selenium	U	45	"							U
Tin	U	15	"							U
Strontium	U	5.0	"							U
Titanium	U	5.0	"							U
Thallium	U	30	"							U
Vanadium	U	5.0	"							U
Yttrium	U	3.0	"							U
Zinc	U	10	"							MRL-2, U
Aluminum	U	100	"							U
Manganese	U	5.0	"							U
Calcium	U	250	"							U
Magnesium	U	250	"							U
Iron	U	100	"							U
Sodium	U	1000	"							U
Potassium	U	1000	"							U



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Total Metals (TMTL) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
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Batch 1108015 - M 200.2 Metals Water

LCS (1108015-BS1)

Prepared: 08/03/11 Analyzed: 08/10/11

EPA 200.7

Silver	100.22	5.0	ug/L	100.00		100	85-115		
Arsenic	195.03	50	"	200.00		97.5	85-115		
Barium	194.52	5.0	"	200.00		97.3	85-115		
Beryllium	49.917	3.0	"	50.000		99.8	85-115		
Boron	U	50	"				85-115		U
Cadmium	47.495	5.0	"	50.000		95.0	85-115		
Cobalt	93.868	5.0	"	100.00		93.9	85-115		
Chromium	196.87	5.0	"	200.00		98.4	85-115		
Copper	96.332	10	"	100.00		96.3	85-115		
Molybdenum	101.20	5.0	"	100.00		101	85-115		
Nickel	196.02	10	"	200.00		98.0	85-115		
Lead	190.02	20	"	200.00		95.0	85-115		
Antimony	199.17	40	"	200.00		99.6	85-115		
Selenium	202.72	45	"	200.00		101	85-115		
Tin	104.51	15	"	100.00		105	85-115		
Strontium	99.468	5.0	"	100.00		99.5	85-115		
Titanium	102.12	5.0	"	100.00		102	85-115		
Thallium	180.07	30	"	200.00		90.0	85-115		
Vanadium	98.627	5.0	"	100.00		98.6	85-115		
Yttrium	97.591	3.0	"	100.00		97.6	85-115		
Zinc	196.45	10	"	200.00		98.2	85-115		
Aluminum	5182.9	100	"	5000.0		104	85-115		
Manganese	508.66	5.0	"	500.00		102	85-115		
Calcium	5206.5	250	"	5000.0		104	85-115		
Magnesium	5357.9	250	"	5000.0		107	85-115		
Iron	5223.2	100	"	5000.0		104	85-115		
Sodium	10322	1000	"	10000		103	85-115		
Potassium	9728.4	1000	"	10000		97.3	85-115		



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Total Metals (TMTL) - Quality Control
US-EPA, Region 4, SEDS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1108015 - M 200.2 Metals Water										
Matrix Spike (1108015-MS1)		Source: E113108-15		Prepared: 08/03/11 Analyzed: 08/10/11						
EPA 200.7										
Silver	104.66	5.0	ug/L	100.00	U	105	70-130			
Arsenic	210.63	50	"	200.00	U	105	70-130			
Barium	276.38	5.0	"	200.00	73.113	102	70-130			
Beryllium	52.399	3.0	"	50.000	U	105	70-130			
Boron	134.19	50	"		131.14		70-130			
Cadmium	50.275	5.0	"	50.000	U	101	70-130			
Cobalt	99.390	5.0	"	100.00	1.0338	98.4	70-130			
Chromium	204.15	5.0	"	200.00	U	102	70-130			
Copper	144.91	10	"	100.00	38.571	106	70-130			
Molybdenum	125.00	5.0	"	100.00	18.275	107	70-130			
Nickel	206.55	10	"	200.00	3.8845	101	70-130			
Lead	200.87	20	"	200.00	U	100	70-130			
Antimony	210.08	40	"	200.00	U	105	70-130			
Selenium	217.96	45	"	200.00	U	109	70-130			
Tin	97.092	15	"	100.00	U	97.1	70-130			
Strontium	382.63	5.0	"	100.00	266.90	116	70-130			
Titanium	108.33	5.0	"	100.00	4.8200	104	70-130			
Thallium	181.84	30	"	200.00	U	90.9	70-130			
Vanadium	105.73	5.0	"	100.00	U	106	70-130			
Yttrium	104.42	3.0	"	100.00	1.2053	103	70-130			
Zinc	307.51	10	"	200.00	92.342	108	70-130			
Aluminum	6076.0	100	"	5000.0	629.85	109	70-130			
Manganese	645.96	5.0	"	500.00	116.23	106	70-130			
Calcium	22657	250	"	5000.0	17257	108	70-130			
Magnesium	11372	250	"	5000.0	5667.7	114	70-130			
Iron	7035.9	100	"	5000.0	1598.6	109	70-130			
Sodium	119600	1000	"	10000	105280	143	70-130			XM-1
Potassium	28028	1000	"	10000	18545	94.8	70-130			



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Total Metals (TMTL) - Quality Control

US-EPA, Region 4, SEDS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1108015 - M 200.2 Metals Water										
Matrix Spike (1108015-MS2)		Source: E113109-06		Prepared: 08/03/11 Analyzed: 08/10/11						
EPA 200.7										
Silver	96.888	5.0	ug/L	100.00	U	96.9	70-130			
Arsenic	192.48	50	"	200.00	U	96.2	70-130			
Barium	227.40	5.0	"	200.00	31.215	98.1	70-130			
Beryllium	50.009	3.0	"	50.000	U	100	70-130			
Boron	149.22	50	"		154.17		70-130			
Cadmium	44.906	5.0	"	50.000	U	89.8	70-130			
Cobalt	92.336	5.0	"	100.00	U	92.3	70-130			
Chromium	188.90	5.0	"	200.00	U	94.5	70-130			
Copper	105.17	10	"	100.00	8.1542	97.0	70-130			
Molybdenum	101.86	5.0	"	100.00	3.9059	98.0	70-130			
Nickel	189.85	10	"	200.00	2.5140	93.7	70-130			
Lead	187.37	20	"	200.00	U	93.7	70-130			
Antimony	193.25	40	"	200.00	U	96.6	70-130			
Selenium	209.29	45	"	200.00	U	105	70-130			
Tin	98.209	15	"	100.00	U	98.2	70-130			
Strontium	238.41	5.0	"	100.00	147.42	91.0	70-130			
Titanium	102.01	5.0	"	100.00	U	102	70-130			
Thallium	174.56	30	"	200.00	U	87.3	70-130			
Vanadium	97.668	5.0	"	100.00	U	97.7	70-130			
Yttrium	96.604	3.0	"	100.00	0.25508	96.3	70-130			
Zinc	221.42	10	"	200.00	20.541	100	70-130			
Aluminum	5166.1	100	"	5000.0	141.92	100	70-130			
Manganese	561.53	5.0	"	500.00	77.508	96.8	70-130			
Calcium	16044	250	"	5000.0	11482	91.2	70-130			
Magnesium	8493.6	250	"	5000.0	3387.7	102	70-130			
Iron	5653.5	100	"	5000.0	513.73	103	70-130			
Sodium	64383	1000	"	10000	56124	82.6	70-130			
Potassium	19651	1000	"	10000	10561	90.9	70-130			



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Total Metals (TMTL) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1108015 - M 200.2 Metals Water										
Matrix Spike Dup (1108015-MSD1)		Source: E113108-15			Prepared: 08/03/11 Analyzed: 08/10/11					
EPA 200.7										
Silver	98.978	5.0	ug/L	100.00	U	99.0	70-130	5.58	20	
Arsenic	202.30	50	"	200.00	U	101	70-130	4.03	20	
Barium	265.93	5.0	"	200.00	73.113	96.4	70-130	3.86	20	
Beryllium	50.840	3.0	"	50.000	U	102	70-130	3.02	20	
Boron	127.76	50	"		131.14		70-130	4.91	20	
Cadmium	47.942	5.0	"	50.000	U	95.9	70-130	4.75	20	
Cobalt	94.303	5.0	"	100.00	1.0338	93.3	70-130	5.25	20	
Chromium	193.31	5.0	"	200.00	U	96.7	70-130	5.46	20	
Copper	139.60	10	"	100.00	38.571	101	70-130	3.73	20	
Molybdenum	117.65	5.0	"	100.00	18.275	99.4	70-130	6.06	20	
Nickel	195.43	10	"	200.00	3.8845	95.8	70-130	5.53	20	
Lead	190.83	20	"	200.00	U	95.4	70-130	5.13	20	
Antimony	197.92	40	"	200.00	U	99.0	70-130	5.96	20	
Selenium	213.27	45	"	200.00	U	107	70-130	2.17	20	
Tin	94.633	15	"	100.00	U	94.6	70-130	2.57	20	
Strontium	355.59	5.0	"	100.00	266.90	88.7	70-130	7.33	20	
Titanium	105.68	5.0	"	100.00	4.8200	101	70-130	2.47	20	
Thallium	176.60	30	"	200.00	U	88.3	70-130	2.92	20	
Vanadium	100.46	5.0	"	100.00	U	100	70-130	5.11	20	
Yttrium	98.686	3.0	"	100.00	1.2053	97.5	70-130	5.65	20	
Zinc	292.80	10	"	200.00	92.342	100	70-130	4.90	20	
Aluminum	5809.7	100	"	5000.0	629.85	104	70-130	4.48	20	
Manganese	615.33	5.0	"	500.00	116.23	99.8	70-130	4.86	20	
Calcium	21525	250	"	5000.0	17257	85.3	70-130	5.13	20	
Magnesium	10816	250	"	5000.0	5667.7	103	70-130	5.01	20	
Iron	6824.8	100	"	5000.0	1598.6	105	70-130	3.05	20	
Sodium	112430	1000	"	10000	105280	71.4	70-130	6.18	20	XM-1
Potassium	27088	1000	"	10000	18545	85.4	70-130	3.41	20	



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Project: 11-0591, Hattiesburg South Lagoon CSI - Reported by Jenny Scifres

Total Metals (TMTL) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 1108015 - M 200.2 Metals Water

Matrix Spike Dup (1108015-MSD2)

Source: E113109-06

Prepared: 08/03/11 Analyzed: 08/10/11

EPA 200.7

Silver	100.59	5.0	ug/L	100.00	U	101	70-130	3.75	20	
Arsenic	199.72	50	"	200.00	U	99.9	70-130	3.69	20	
Barium	230.35	5.0	"	200.00	31.215	99.6	70-130	1.29	20	
Beryllium	50.552	3.0	"	50.000	U	101	70-130	1.08	20	
Boron	153.48	50	"		154.17		70-130	2.81	20	
Cadmium	47.531	5.0	"	50.000	U	95.1	70-130	5.68	20	
Cobalt	96.225	5.0	"	100.00	U	96.2	70-130	4.12	20	
Chromium	200.29	5.0	"	200.00	U	100	70-130	5.85	20	
Copper	108.06	10	"	100.00	8.1542	99.9	70-130	2.71	20	
Molybdenum	106.56	5.0	"	100.00	3.9059	103	70-130	4.51	20	
Nickel	198.00	10	"	200.00	2.5140	97.7	70-130	4.20	20	
Lead	195.57	20	"	200.00	U	97.8	70-130	4.28	20	
Antimony	204.88	40	"	200.00	U	102	70-130	5.84	20	
Selenium	206.46	45	"	200.00	U	103	70-130	1.36	20	
Tin	105.79	15	"	100.00	U	106	70-130	7.43	20	
Strontium	242.98	5.0	"	100.00	147.42	95.6	70-130	1.90	20	
Titanium	104.89	5.0	"	100.00	U	105	70-130	2.78	20	
Thallium	189.12	30	"	200.00	U	94.6	70-130	8.01	20	
Vanadium	101.85	5.0	"	100.00	U	102	70-130	4.19	20	
Yttrium	98.093	3.0	"	100.00	0.25508	97.8	70-130	1.53	20	
Zinc	229.60	10	"	200.00	20.541	105	70-130	3.63	20	
Aluminum	5321.9	100	"	5000.0	141.92	104	70-130	2.97	20	
Manganese	582.42	5.0	"	500.00	77.508	101	70-130	3.65	20	
Calcium	16493	250	"	5000.0	11482	100	70-130	2.76	20	
Magnesium	8738.8	250	"	5000.0	3387.7	107	70-130	2.85	20	
Iron	5801.2	100	"	5000.0	513.73	106	70-130	2.58	20	
Sodium	66169	1000	"	10000	56124	100	70-130	2.74	20	
Potassium	20384	1000	"	10000	10561	98.2	70-130	3.66	20	



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 4 Science and Ecosystem Support Division
980 College Station Road, Athens, Georgia 30605-2700

D.A.R.T. Id: 11-0591

Project: 11-0591, Hattiesburg South Lagoon CSI - Reported by Jenny Scifres

Total Metals (TMTL) - Quality Control

US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 1108015 - M 200.2 Metals Water

MRL Verification (1108015-PS1)

Prepared: 08/03/11 Analyzed: 08/10/11

EPA 200.7

Silver	5.5080	5.0	ug/L	5.0000		110	70-130			MRL-2
Arsenic	45.791	50	"	50.000		91.6	70-130			MRL-2, U
Barium	6.0554	5.0	"	5.0000		121	70-130			MRL-2
Beryllium	3.0741	3.0	"	3.0000		102	70-130			MRL-2
Boron	51.086	50	"	50.000		102	70-130			MRL-2
Cadmium	4.9672	5.0	"	5.0000		99.3	70-130			MRL-2, U
Cobalt	5.1286	5.0	"	5.0000		103	70-130			MRL-2
Chromium	5.0481	5.0	"	5.0000		101	70-130			MRL-2
Copper	10.100	10	"	10.000		101	70-130			MRL-2
Molybdenum	11.234	5.0	"	10.000		112	70-130			MRL-2
Nickel	11.578	10	"	10.000		116	70-130			MRL-2
Lead	19.158	20	"	20.000		95.8	70-130			MRL-2, U
Antimony	40.471	40	"	40.000		101	70-130			MRL-2
Selenium	50.462	45	"	45.000		112	70-130			MRL-2
Tin	15.374	15	"	15.000		102	70-130			MRL-2
Strontium	5.5439	5.0	"	5.0000		111	70-130			MRL-2
Titanium	5.0386	5.0	"	5.0000		101	70-130			MRL-2
Thallium	28.767	30	"	30.000		95.9	70-130			MRL-2, U
Vanadium	4.2505	5.0	"	5.0000		85.0	70-130			MRL-2, U
Yttrium	3.1892	3.0	"	3.0000		106	70-130			MRL-2
Zinc	10.510	10	"	10.000		105	70-130			MRL-2
Aluminum	119.29	100	"	100.00		119	70-130			MRL-2
Manganese	5.1329	5.0	"	5.0000		103	70-130			MRL-2
Calcium	329.18	250	"	250.00		132	70-130			MRL-2, QR-2
Magnesium	273.50	250	"	250.00		109	70-130			MRL-2
Iron	110.13	100	"	100.00		110	70-130			MRL-2
Sodium	1332.2	1000	"	1000.0		133	70-130			MRL-2, QR-2
Potassium	1021.0	1000	"	1000.0		102	70-130			MRL-2



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D.A.R.T. Id: 11-0591

Project: 11-0591, Hattiesburg South Lagoon CSI - Reported by Jenny Scifres

Total Metals (TMTL) - Quality Control

US-EPA, Region 4, SED

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 1108016 - M 200.2 Metals Water

Blank (1108016-BLK1)

Prepared: 08/03/11 Analyzed: 08/11/11

EPA 200.8

Arsenic	U	1.0	ug/L							U
Selenium	U	2.0	"							U
Cadmium	U	0.50	"							U
Antimony	U	1.0	"							U
Thallium	U	1.0	"							U
Lead	U	1.0	"							U

LCS (1108016-BS1)

Prepared: 08/03/11 Analyzed: 08/11/11

EPA 200.8

Arsenic	197.32	5.0	ug/L	200.00		98.7	85-115
Selenium	200.32	10	"	200.00		100	85-115
Cadmium	48.619	2.5	"	50.000		97.2	85-115
Antimony	190.89	5.0	"	200.00		95.4	85-115
Thallium	212.50	5.0	"	200.00		106	85-115
Lead	204.36	5.0	"	200.00		102	85-115

Matrix Spike (1108016-MS1)

Source: E113108-15

Prepared: 08/03/11 Analyzed: 08/11/11

EPA 200.8

Arsenic	202.74	5.0	ug/L	200.00	1.0871	101	70-130
Selenium	206.16	10	"	200.00	0.56160	103	70-130
Cadmium	49.938	2.5	"	50.000	0.087054	99.7	70-130
Antimony	195.36	5.0	"	200.00	0.27743	97.5	70-130
Thallium	206.74	5.0	"	200.00	U	103	70-130
Lead	200.21	5.0	"	200.00	1.0380	99.6	70-130

Matrix Spike (1108016-MS2)

Source: E113109-06

Prepared: 08/03/11 Analyzed: 08/11/11

EPA 200.8

Arsenic	200.18	5.0	ug/L	200.00	0.83490	99.7	70-130
Selenium	204.50	10	"	200.00	U	102	70-130
Cadmium	48.909	2.5	"	50.000	U	97.8	70-130
Antimony	193.25	5.0	"	200.00	0.29339	96.5	70-130
Thallium	208.14	5.0	"	200.00	U	104	70-130
Lead	202.76	5.0	"	200.00	1.7675	100	70-130



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D.A.R.T. Id: 11-0591

Project: 11-0591, Hattiesburg South Lagoon CSI - Reported by Jenny Scifres

Total Metals (TMTL) - Quality Control

US-EPA, Region 4, SEDS

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 1108016 - M 200.2 Metals Water

Matrix Spike Dup (1108016-MSD1)

Source: E113108-15

Prepared: 08/03/11 Analyzed: 08/11/11

EPA 200.8

Arsenic	203.10	5.0	ug/L	200.00	1.0871	101	70-130	0.178	20	
Selenium	205.25	10	"	200.00	0.56160	102	70-130	0.444	20	
Cadmium	49.223	2.5	"	50.000	0.087054	98.3	70-130	1.44	20	
Antimony	193.45	5.0	"	200.00	0.27743	96.6	70-130	0.984	20	
Thallium	207.19	5.0	"	200.00	U	104	70-130	0.218	20	
Lead	199.99	5.0	"	200.00	1.0380	99.5	70-130	0.109	20	

Matrix Spike Dup (1108016-MSD2)

Source: E113109-06

Prepared: 08/03/11 Analyzed: 08/11/11

EPA 200.8

Arsenic	197.63	5.0	ug/L	200.00	0.83490	98.4	70-130	1.28	20	
Selenium	200.40	10	"	200.00	U	100	70-130	2.02	20	
Cadmium	48.329	2.5	"	50.000	U	96.7	70-130	1.19	20	
Antimony	191.09	5.0	"	200.00	0.29339	95.4	70-130	1.12	20	
Thallium	206.79	5.0	"	200.00	U	103	70-130	0.652	20	
Lead	200.19	5.0	"	200.00	1.7675	99.2	70-130	1.28	20	

MRL Verification (1108016-PS1)

Prepared: 08/03/11 Analyzed: 08/11/11

EPA 200.8

Arsenic	0.98602	1.0	ug/L	1.0000		98.6	65-135			MRL-2, U
Selenium	2.0654	2.0	"	2.0000		103	65-135			MRL-2
Cadmium	0.47697	0.50	"	0.50000		95.4	65-135			MRL-2, U
Antimony	0.51639	1.0	"	0.50000		103	65-135			MRL-2, U
Thallium	0.54100	1.0	"	0.50000		108	65-135			MRL-2, U
Lead	0.70817	1.0	"	1.0000		70.8	65-135			MRL-2, U

Batch 1108099 - M 245.1 Hg Wtr

Blank (1108099-BLK1)

Prepared & Analyzed: 08/23/11

EPA 245.1

Mercury	U	0.10	ug/L							U
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D.A.R.T. Id: 11-0591

Project: 11-0591, Hattiesburg South Lagoon CSI - Reported by Jenny Scifres

Total Metals (TMTL) - Quality Control
US-EPA, Region 4, SESD

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 1108099 - M 245.1 Hg Wtr										
LCS (1108099-BS1)				Prepared & Analyzed: 08/23/11						
EPA 245.1										
Mercury	2.0730	0.10	ug/L	2.0000		104	85-115			
LCS Dup (1108099-BSD1)				Prepared & Analyzed: 08/23/11						
EPA 245.1										
Mercury	2.0960	0.10	ug/L	2.0000		105	85-115	1.10	20	
Matrix Spike (1108099-MS1)				Source: E113108-13	Prepared & Analyzed: 08/23/11					
EPA 245.1										
Mercury	2.0720	0.10	ug/L	2.0000	0.088000	99.2	70-130			
Matrix Spike (1108099-MS2)				Source: E113109-06	Prepared & Analyzed: 08/23/11					
EPA 245.1										
Mercury	1.7940	0.10	ug/L	2.0000	U	89.7	70-130			
Matrix Spike Dup (1108099-MSD1)				Source: E113108-13	Prepared & Analyzed: 08/23/11					
EPA 245.1										
Mercury	1.9460	0.10	ug/L	2.0000	0.088000	92.9	70-130	6.56	20	
Matrix Spike Dup (1108099-MSD2)				Source: E113109-06	Prepared & Analyzed: 08/23/11					
EPA 245.1										
Mercury	1.8650	0.10	ug/L	2.0000	U	93.2	70-130	3.88	20	
MRL Verification (1108099-PS1)				Prepared & Analyzed: 08/23/11						
EPA 245.1										
Mercury	0.081000	0.10	ug/L				65-135			MRL-2, U



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D.A.R.T. Id: 11-0591

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Notes and Definitions for QC Samples

U	The analyte was not detected at or above the reporting limit.
B-3	Level in blank does not impact data quality
MRL-2	MRL verification for Non-Potable Water matrix
QC-5	Calibration check standard less than method control limits.
QC-6	Calibration check standard greater than method control limits.
QR-2	MRL verification recovery greater than upper control limits.
XM-1	Sample background/spike ratio higher than method evaluation criteria

**U.S. Environmental Protection Agency, Region 4
Science and Ecosystem Support Division
980 College Station Road
Athens, GA 30605**



**Hattiesburg South and Hattiesburg North Wastewater Treatment
Plant Time-of-Travel Study
Hattiesburg, Mississippi
July - August 2011
Final Report**

Prepared by:



Hunter Johnson, Environmental Engineer

Date:

9/2/2011

TABLE OF CONTENTS

1.0	Introduction	.....	4
2.0	Objectives	.....	4
3.0	Study Area	.....	4
4.0	Methods	.....	4
5.0	Results	.....	5
5.1	Hattiesburg South Wastewater Treatment Plant	.....	5
5.2	Hattiesburg North Wastewater Treatment Plant	.....	6
6.0	Quality Assurance	.....	7
7.0	Conclusion	.....	8
8.0	References	.....	8
	End of Report	.....	10

LIST OF FIGURES

Figure 1: Hattiesburg South WWTP Dye Tracer Data	5
Figure 2: Hattiesburg North WWTP Dye Tracer Data	6

LIST OF TABLES

Table 1: Location of Study Sites	4
Table 2: Primary Instrument Sensitivity	7

1.0 Introduction

At the request of Richard Elliot of the EPA Region 4 Science and Ecosystem Support Division (SESD), Enforcement and Investigations Branch (EIB), the Ecological Assessment Branch (EAB) conducted dye tracer studies to determine the time of travel in the Hattiesburg South and Hattiesburg North Wastewater Treatment Plants in Hattiesburg, Mississippi as part of compliance sampling inspections led by EPA.

Dye studies were conducted under Quality Assurance Project Plans prepared by the EIB project leader for compliance sampling inspections at each facility.

2.0 Objectives

The primary objective of this survey was to conduct dye tracer studies to determine the time of travel in the Hattiesburg South and Hattiesburg North Wastewater Treatment Plants in Hattiesburg, Mississippi.

3.0 Study Area

For the North plant an outfall pipe located at the chlorination basin was monitored during this study. After equipment setup at the monitoring location, the dye tracer study commenced with a release of dye at the Northwest side of the lagoon near the main discharge into the treatment plant.

For the South plant an outfall pipe located at the chlorination basin was monitored during this study. After equipment setup at the monitoring location, the dye tracer study commenced with a release of dye at the Southwest side of the lagoon near the main industrial discharge into the treatment plant.

Site	Latitude	Longitude
North Plant Monitoring Site	N 31° 21.677'	W 089° 20.261'
North Plant Dye Release	N 31° 21.623'	W 089° 19.972'
South Plant Monitoring Site	N 31° 18.138'	W 089° 16.254'
South Plant Dye Release	N 31° 18.917'	W 089° 15.549'

Table 1: Locations of Study Sites

4.0 Methods

At both plants a single "instantaneous" release of Rhodamine WT was conducted at a main discharge into the treatment plant. Monitoring for Rhodamine WT dye was conducted at the plants' outfall pipes using YSI Data Sondes. The sondes were utilized

for their data logging capability and were programmed to record every fifteen minutes following the In-Situ Water Quality Monitoring (SESDPROC-111-R2) and Dye Tracer Measurement (SESDPROC-514-R0) operating procedures.

The latitude/longitude of the monitoring and release sites were recorded with a Garmin handheld GPS following the Global Positioning System (SESDPROC-110-R3) operating procedure. Time of releases and other pertinent information was recorded in site specific logbooks following the SESD Logbooks (SESDPROC-010-R4) operating procedure.

5.0 Results

5.1 Hattiesburg South Wastewater Treatment Plant

At approximately 1025 on July 26, 2011, at the Hattiesburg South Wastewater Treatment Plant a sonde was deployed in order to measure background readings in the outfall. These readings were to insure that there were no substances in the system that would cause the monitoring equipment to give an erroneous reading.

An "instantaneous" Rhodamine WT release was conducted at 1345 on July 27, 2011. Following the release, the sonde was left deployed for an extended period of time in an effort to ensure that the dye cloud was captured by the equipment. The sonde was retrieved from its location at approximately 0800 on August 16, 2011. The data collected by the sonde is illustrated in the Figure 1. It should be noted that unusually high back ground readings were detected throughout the duration of the study.

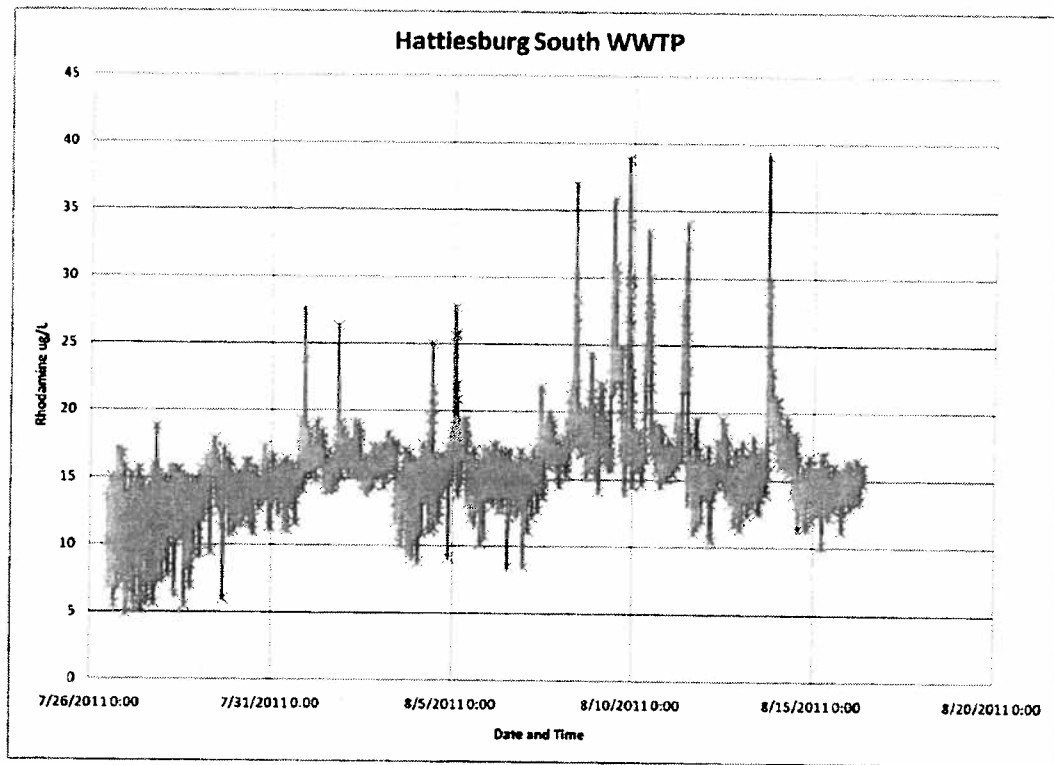


Figure 1: Hattiesburg South WWTP Dye Tracer Data

5.2 Hattiesburg North Wastewater Treatment Plant

At approximately 1620 on July 26, 2011, at the Hattiesburg North Wastewater Treatment Plant a sonde was deployed in order to measure background readings in the outfall.

An "instantaneous" Rhodamine WT release was conducted at 1500 on July 27, 2011. Following the release, the sonde was left deployed for an extended period of time in an effort to ensure that the dye cloud was captured by the equipment. The sonde was retrieved for its location at approximately 900 on August 16, 2011. The data collected by the sonde is illustrated in the Figure 2. It should be noted that at approximately 1600 on August 9 the sonde discontinued the logging program.

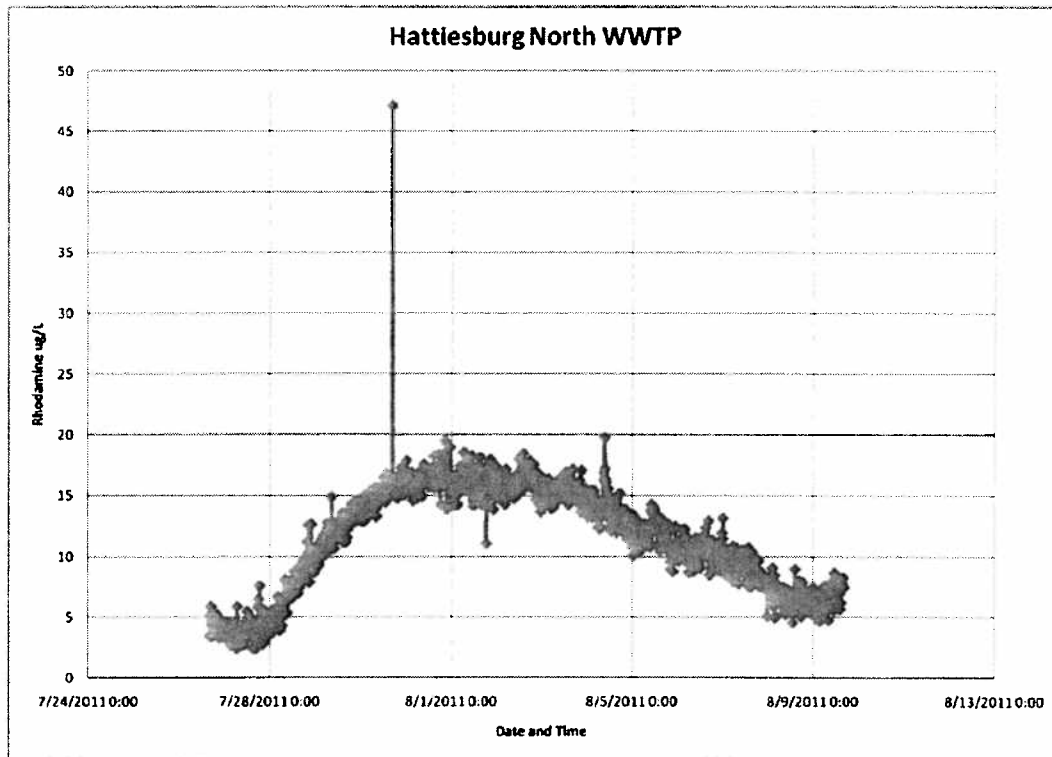


Figure 2: Hattiesburg North WWTP Dye Tracer Data

6.0 Quality Assurance

Quality control procedures were used in the field to ensure that reliable data was obtained. YSI Data Sondes were calibrated prior to use and end calibration checked at the end of study. Both sondes were within an acceptable range at end check. Instrument sensitivities for field measurement equipment are shown in Table 2.

Field Parameter	Units	Monitoring Method	Sensitivity of Primary Equipment
Rhodamine Dye	ug/L	YSI Data Sonde	±5 %
GPS	Lat/Long.	GPS Receiver	±10 m

Table 2 – Primary Instrument Sensitivity

7.0 Conclusion

On July 26, 2011, the Ecological Assessment Branch of EPA/SESD initiated two dye tracer studies in Hattiesburg, Mississippi. The studies were designed to determine the time of travel of the Hattiesburg North and Hattiesburg South Wastewater Treatment Plants. The studies consisted of an "instantaneous" release of Rhodamine WT at both treatment plants followed by monitoring at the plants' outfall.

Unusually high background levels from the Hattiesburg South WWTP combined with no clear initial detection of dye precluded determination of a time of travel. Data spikes were detected at intermittent intervals throughout the entire duration of the study but are most likely the result of the background levels found in the lagoon. At the time of the instrument's retrieval, elevated levels of dye beyond the background levels had not been detected therefore it can be concluded that most of the dye remained in the plant for a time period that exceeded the sonde deployment.

The discontinuation of the sonde logging program at the Hattiesburg North WWTP precluded determination of a precise time of travel. It is evident that the first elevated sign of dye was detected on July 28 at approximately 0530. An estimated centroid was calculated from the data set in order to produce an estimated time of travel. The estimated centroid reached the monitoring station on August 4 at 0815 equating to a time of travel of 8.13 days. From the results it can be concluded that even though the concentration levels, at the time the sonde discontinued logging, were slightly higher than the initial background level the majority of the dye had been released from the system.

8.0 References

Operating Procedure for Global Positioning System, SESDPROC-110-R3, 2011, Region 4, SESD, Athens, Georgia.

Operating Procedure for In-Situ Water Quality Monitoring, SESDPROC-111-R2, 2009, Region 4, SESD, Athens, Georgia.

Operating Procedure for Hydrological Studies, SESDPROC-501-R2, 2009, Region 4, SESD, Athens, Georgia.

Operating Procedure for Dye Tracer Measurement, SESDPROC-514-R0, 2009, Region 4, SESD, Athens, Georgia.

Operating Procedure for Surface Water Sampling, SESDPROC-201-R1, 2007, Region 4, SESD, Athens, Georgia.

Operating Procedure for Field Sampling Quality Control, SESDPROC-011-R3, 2010, Region 4, SESD, Athens, Georgia.

Operating Procedure for Logbooks, SESDPROC-010-R3, 2010, Region 4, SESD, Athens, Georgia.

Operating Procedure for Report Preparation and Distribution, SESDPROC-003-R2, 2009, Region 4, SESD, Athens, Georgia.

Operating Procedure for Project Planning, SESDPROC-016-R1, 2010, Region 4, SESD, Athens, Georgia.

Operating Procedure for Sample and Evidence Management, SESDPROC-005-R1, 2007, Region 4, SESD, Athens, Georgia.

Operating Procedure for Control of Records, SESDPROC-002-R4, 2010, Region 4, SESD, Athens, Georgia.

Operating Procedure for Purchasing of Services and Supplies, SESDPROC-015-R2, 2009, Region 4, SESD, Athens, Georgia.

USGS Real – Time Water Data for Mississippi, <http://waterdata.usgs.gov/ms/nwis/rt>, July 26, 2011

End of Report

ATTACHMENT 3 (Sonde Data)

	DateTime M/D/Y	Temp C	SpCond mS/cm	pH	Turbidity+ NTU	ODO% %	ODO Conc mg/L
1	7/26/2011 12:50	27.91	0.06		6.72	25	79.4
2	7/26/2011 13:00	27.9	0.06		6.57	26.1	79.4
3	7/26/2011 13:10	27.97	0.06		6.55	25.8	79.8
4	7/26/2011 13:20	27.98	0.06		6.55	24.7	80
5	7/26/2011 13:30	27.99	0.06		6.55	25.4	80
6	7/26/2011 13:40	28.08	0.06		6.54	26.1	80.5
7	7/26/2011 13:50	27.98	0.06		6.53	24.7	80.1
8	7/26/2011 14:00	28.06	0.06		6.54	25	80.5
9	7/26/2011 14:10	28.19	0.06		6.53	24.7	81.2
10	7/26/2011 14:20	28.24	0.06		6.55	25.8	81.5
11	7/26/2011 14:30	28.39	0.06		6.55	23.9	82.4
12	7/26/2011 14:40	28.31	0.06		6.55	24.3	82.1
13	7/26/2011 14:50	28.26	0.06		6.54	25.3	82.3
14	7/26/2011 15:00	28.34	0.06		6.54	23.9	82.6
15	7/26/2011 15:10	28.23	0.06		6.54	24.2	82.5
16	7/26/2011 15:20	28.38	0.06		6.54	22.4	83.3
17	7/26/2011 15:30	28.28	0.06		6.56	23.8	82.8
18	7/26/2011 15:40	28.33	0.06		6.56	23	83.2
19	7/26/2011 15:50	28.36	0.06		6.55	22.7	83.3
20	7/26/2011 16:00	28.27	0.06		6.54	24.1	82.5
21	7/26/2011 16:10	28.25	0.06		6.53	24.5	82.4
22	7/26/2011 16:20	28.3	0.06		6.55	23.8	82.6
23	7/26/2011 16:30	28.38	0.06		6.54	24.7	82.9
24	7/26/2011 16:40	28.4	0.06		6.54	23.3	82.8
25	7/26/2011 16:50	28.41	0.06		6.53	24	82.8
26	7/26/2011 17:00	28.43	0.06		6.55	23.6	82.8
27	7/26/2011 17:10	28.47	0.06		6.56	24.7	83.2
28	7/26/2011 17:20	28.5	0.06		6.55	23.8	83.5
29	7/26/2011 17:30	28.49	0.06		6.56	24.2	83.7
30	7/26/2011 17:40	28.48	0.06		6.55	23.8	83.8
31	7/26/2011 17:50	28.48	0.06		6.56	24.1	84.1
32	7/26/2011 18:00	28.48	0.06		6.56	24.5	84.5
33	7/26/2011 18:10	28.53	0.06		6.57	23.4	84.9
34	7/26/2011 18:20	28.46	0.06		6.56	24.3	84.9
35	7/26/2011 18:30	28.45	0.06		6.56	23.8	85
36	7/26/2011 18:40	28.44	0.06		6.56	24.7	85.1
37	7/26/2011 18:50	28.41	0.059		6.55	23.7	84.9
38	7/26/2011 19:00	28.36	0.059		6.56	24.5	84.4
39	7/26/2011 19:10	28.32	0.059		6.55	24.9	84.1
40	7/26/2011 19:20	28.3	0.059		6.55	25	84.1
41	7/26/2011 19:30	28.27	0.059		6.55	24.4	83.9
42	7/26/2011 19:40	28.25	0.059		6.54	25.4	83.5
43	7/26/2011 19:50	28.21	0.059		6.54	26.2	83.3

ATTACHMENT 3 (Sonde Data)

44	7/26/2011 20:00	28.17	0.059	6.53	25.8	83	6.47
45	7/26/2011 20:10	28.15	0.059	6.52	26.1	82.8	6.46
46	7/26/2011 20:20	28.12	0.059	6.52	26	82.5	6.45
47	7/26/2011 20:30	28.09	0.059	6.52	25.3	82.3	6.43
48	7/26/2011 20:40	28.05	0.059	6.51	26.8	82	6.41
49	7/26/2011 20:50	28	0.058	6.5	26.5	81.9	6.41
50	7/26/2011 21:00	27.95	0.058	6.51	26.5	81.8	6.41
51	7/26/2011 21:10	27.9	0.058	6.51	27.1	81.5	6.39
52	7/26/2011 21:20	27.85	0.058	6.5	26.7	81.2	6.38
53	7/26/2011 21:30	27.82	0.058	6.51	25.5	80.9	6.36
54	7/26/2011 21:40	27.76	0.058	6.49	27.8	80.5	6.33
55	7/26/2011 21:50	27.73	0.058	6.48	27	80.2	6.31
56	7/26/2011 22:00	27.7	0.058	6.47	26.8	79.8	6.28
57	7/26/2011 22:10	27.67	0.058	6.47	26.4	79.6	6.26
58	7/26/2011 22:20	27.64	0.058	6.47	28	79.3	6.25
59	7/26/2011 22:30	27.6	0.058	6.47	27.4	79	6.23
60	7/26/2011 22:40	27.58	0.058	6.47	27.3	78.8	6.22
61	7/26/2011 22:50	27.56	0.058	6.46	27.6	78.5	6.19
62	7/26/2011 23:00	27.53	0.058	6.47	27.5	78.2	6.17
63	7/26/2011 23:10	27.51	0.058	6.46	27.1	78	6.16
64	7/26/2011 23:20	27.49	0.058	6.45	27.8	77.7	6.14
65	7/26/2011 23:30	27.46	0.058	6.46	27.1	77.5	6.12
66	7/26/2011 23:40	27.44	0.058	6.45	27.4	77.1	6.1
67	7/26/2011 23:50	27.4	0.058	6.45	27.2	76.9	6.08
68	7/27/2011 0:00	27.37	0.057	6.45	27.2	76.5	6.05
69	7/27/2011 0:10	27.34	0.058	6.45	26.5	76.3	6.05
70	7/27/2011 0:20	27.3	0.058	6.44	27.5	75.9	6.01
71	7/27/2011 0:30	27.27	0.058	6.44	27.7	75.4	5.98
72	7/27/2011 0:40	27.24	0.058	6.44	27.6	75.2	5.97
73	7/27/2011 0:50	27.21	0.058	6.43	28.3	75	5.96
74	7/27/2011 1:00	27.18	0.058	6.44	27.5	74.8	5.94
75	7/27/2011 1:10	27.16	0.058	6.44	28.2	74.6	5.93
76	7/27/2011 1:20	27.14	0.058	6.43	26.7	74.2	5.9
77	7/27/2011 1:30	27.11	0.058	6.44	27.9	74.1	5.89
78	7/27/2011 1:40	27.1	0.058	6.43	27.2	73.9	5.88
79	7/27/2011 1:50	27.08	0.058	6.43	28.3	73.8	5.87
80	7/27/2011 2:00	27.06	0.058	6.44	28.1	73.8	5.87
81	7/27/2011 2:10	27.05	0.058	6.43	28	73.8	5.88
82	7/27/2011 2:20	27.04	0.058	6.44	28.1	73.8	5.87
83	7/27/2011 2:30	27.03	0.058	6.45	27.2	73.7	5.87
84	7/27/2011 2:40	27.02	0.058	6.45	27.8	73.8	5.88
85	7/27/2011 2:50	27.01	0.058	6.45	27.5	73.9	5.88
86	7/27/2011 3:00	26.99	0.059	6.46	28.1	73.8	5.88
87	7/27/2011 3:10	26.98	0.059	6.46	27.6	73.8	5.88
88	7/27/2011 3:20	26.97	0.059	6.46	27.4	73.7	5.88
89	7/27/2011 3:30	26.96	0.059	6.46	27.8	73.7	5.87
90	7/27/2011 3:40	26.94	0.059	6.46	26.9	73.6	5.87

ATTACHMENT 3 (Sonde Data)

91	7/27/2011 3:50	26.93	0.059	6.45	27.5	73.5	5.86
92	7/27/2011 4:00	26.91	0.059	6.46	26.8	73.3	5.85
93	7/27/2011 4:10	26.9	0.059	6.45	27.1	73.2	5.84
94	7/27/2011 4:20	26.88	0.059	6.45	27.7	73	5.83
95	7/27/2011 4:30	26.85	0.059	6.46	26.8	73.2	5.85
96	7/27/2011 4:40	26.83	0.059	6.45	27.5	73.2	5.85
97	7/27/2011 4:50	26.83	0.058	6.45	27.2	73.1	5.84
98	7/27/2011 5:00	26.81	0.058	6.45	27.2	73.1	5.84
99	7/27/2011 5:10	26.78	0.058	6.45	27.1	73.1	5.85
100	7/27/2011 5:20	26.77	0.058	6.44	27.1	73.1	5.85
101	7/27/2011 5:30	26.74	0.058	6.44	26.6	73	5.85
102	7/27/2011 5:40	26.73	0.058	6.43	27	73	5.85
103	7/27/2011 5:50	26.7	0.058	6.43	27.6	73.1	5.86
104	7/27/2011 6:00	26.67	0.058	6.43	27.2	73.1	5.86
105	7/27/2011 6:10	26.65	0.058	6.43	27.7	73.1	5.86
106	7/27/2011 6:20	26.64	0.058	6.43	27.2	73	5.86
107	7/27/2011 6:30	26.61	0.058	6.43	27.9	73	5.86
108	7/27/2011 6:40	26.6	0.057	6.43	28	73	5.86
109	7/27/2011 6:50	26.58	0.057	6.43	28.1	73.1	5.87
110	7/27/2011 7:00	26.56	0.057	6.43	27.9	73.1	5.87
111	7/27/2011 7:10	26.55	0.057	6.43	28.7	73.1	5.87
112	7/27/2011 7:20	26.54	0.057	6.43	27.5	73.3	5.89
113	7/27/2011 7:30	26.53	0.057	6.43	28.1	73.4	5.9
114	7/27/2011 7:40	26.52	0.057	6.43	28	73.2	5.89
115	7/27/2011 7:50	26.53	0.057	6.43	28.5	73.3	5.89
116	7/27/2011 8:00	26.52	0.057	6.43	28	73.3	5.89
117	7/27/2011 8:10	26.52	0.057	6.43	28.6	73.7	5.92
118	7/27/2011 8:20	26.5	0.057	6.43	27.8	73.6	5.91
119	7/27/2011 8:30	26.5	0.057	6.43	27.8	73.4	5.9
120	7/27/2011 8:40	26.49	0.057	6.43	27.5	73.4	5.9
121	7/27/2011 8:50	26.51	0.057	6.43	28.1	73.7	5.93
122	7/27/2011 9:00	26.54	0.057	6.44	28	74	5.95
123	7/27/2011 9:10	26.59	0.057	6.44	27.2	74.3	5.96
124	7/27/2011 9:20	26.65	0.057	6.44	29.1	74.6	5.98
125	7/27/2011 9:30	26.69	0.057	6.45	28.1	74.7	5.99
126	7/27/2011 9:40	26.75	0.057	6.44	28.1	75.1	6.01
127	7/27/2011 9:50	26.8	0.057	6.44	28.1	75.5	6.04
128	7/27/2011 10:00	26.83	0.057	6.46	27.7	75.7	6.05
129	7/27/2011 10:10	26.92	0.057	6.46	27.1	76.3	6.09
130	7/27/2011 10:20	26.97	0.057	6.45	27.6	76.6	6.1
131	7/27/2011 10:30	27.03	0.057	6.46	27.6	77.1	6.14
132	7/27/2011 10:40	27.11	0.057	6.47	28	77.4	6.15
133	7/27/2011 10:50	27.27	0.057	6.46	26.4	78.1	6.19
134	7/27/2011 11:00	27.2	0.057	6.47	27	77.7	6.17
135	7/27/2011 11:10	27.31	0.057	6.47	27.8	78.4	6.21
136	7/27/2011 11:20	27.23	0.057	6.46	27.2	78	6.19
137	7/27/2011 11:30	27.37	0.057	6.47	26.6	78.6	6.22

ATTACHMENT 3 (Sonde Data)

138	7/27/2011 11:40	27.41	0.057	6.47	27.8	79.2	6.27
139	7/27/2011 11:50	27.46	0.057	6.47	27.7	79.5	6.28
140	7/27/2011 12:00	27.48	0.057	6.47	27.4	79.4	6.27
141	7/27/2011 12:10	27.49	0.057	6.47	28	79.6	6.29
142	7/27/2011 12:20	27.59	0.057	6.47	27.9	80.2	6.32
143	7/27/2011 12:30	27.69	0.057	6.48	26.5	80.2	6.31
144	7/27/2011 12:40	27.83	0.057	6.48	26.9	80.7	6.34

ATTACHMENT 4

Design Flow = 20.0 MGD or 20,000,000 gal/day

Average Flow = 12.0 MGD or 12,000,000 gal/day

Detention Time = Volume/Flow

Lagoons 1, 2 & 3

Design Detention time = $2.73 \times 10^8 / 20.0 \times 10^6$

= 13.7 days*

Average Detention time = $2.73 \times 10^8 / 12.0 \times 10^6$

= 22.8 days*

Lagoons 4

Design Detention time = $2.63 \times 10^8 / 20.0 \times 10^6$

= 13.2 days*

Average Detention time = $2.63 \times 10^8 / 12.0 \times 10^6$

= 21.9 days*

Total Detention Time

At Design Flow = Range from 27 – 41 days

At Average Flow = Range from 45 – 68 days

Typical Range: 4 – 10 days [Mechanically Aerated Lagoons]

7 – 30 days [Facultative Naturally Aerated Lagoons]

*Calculated detention times may be longer due to the fact that the entire influent flow does not enter one lagoon and enters lagoon at different points. However, the actual influent flow distribution data could not be accurately determined.

Process Calculations

Using Dimensions outlined in Figure A

Pond Areas

$$\begin{aligned}\text{Lagoon 1} &= 1820 \times 2230 \\ &= 4,058,600 \text{ ft}^2 \\ &= 93.2 \text{ Acres} \\ \text{Lagoon 2} &= 1820 \times 2230 \\ &= 4,058,600 \text{ ft}^2 \\ &= 93.2 \text{ Acres} \\ \text{Lagoon 3} &= 1820 \times 2240 \\ &= 4,076,800 \text{ ft}^2 \\ &= 93.6 \text{ Acres} \\ \text{Lagoon 4} &= \frac{1}{2} \times (1770 + 2750) \times 1730 \\ &= 3,909,800 \text{ ft}^2 \\ &= 89.8 \text{ Acres}\end{aligned}$$

$$\begin{aligned}\text{Total Lagoon Area} &= 3,909,800 + 4,058,600 + 4,058,600 + 4,076,800 \\ &= 16,103,800 \text{ ft}^2 \\ &= \underline{\text{Use } 16,100,000 \text{ ft}^2} \\ &= 369.7 \text{ Acres} \\ &= \underline{\text{Use } 370 \text{ Acres}}\end{aligned}$$

$$\text{Pond Depth} = 9 \text{ ft}$$

$$\text{Pond Volume} = \text{Area} \times \text{Depth}$$

$$\begin{aligned}\text{Lagoon 1,2,3} &= 4,058,600 \times 9 \\ &= 3.65 \times 10^7 \text{ ft}^3 \\ &= \underline{2.73 \times 10^8 \text{ gal}} \text{ (each for Lagoon 1,2\&3)} \\ \text{Lagoon 4} &= 3,909,800 \times 9 \\ &= 3.52 \times 10^7 \text{ ft}^3 \\ &= \underline{2.63 \times 10^8 \text{ gal}}\end{aligned}$$

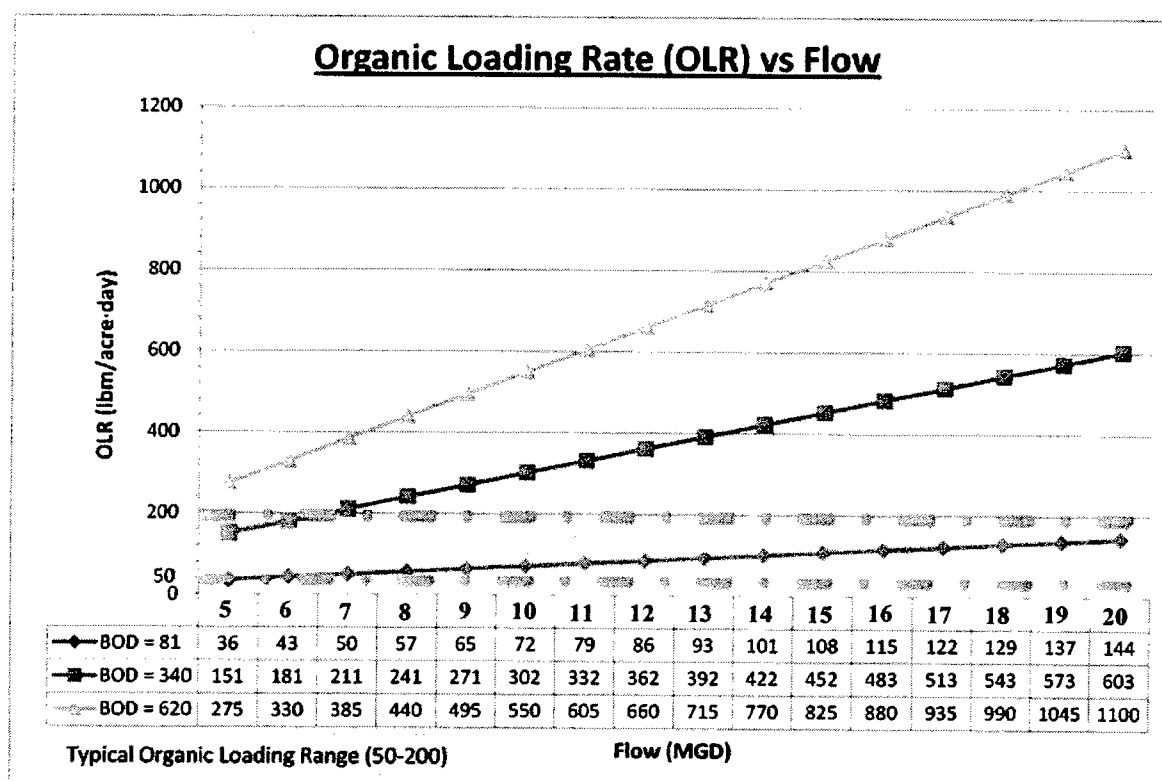
$$\text{Organic Loading Rate (OLR)} = (\text{Flow} * \text{BOD} * 8.34) / \text{Area}$$

Lagoon Area used for graph = 94 Acres

Flow Varies from 5 – 20 MGD

BOD = Influent BOD from Table 2.0

Typical Range: 50 – 200 [Mechanically Aerated Lagoons]
15 – 80 [Facultative Naturally Aerated Lagoons]



The figure above shows that for an average Influent BOD of 81 mg/L (blue line in graph), the plant is not organically overloaded as flow varies to its maximum permitted value (20 MGD). However, at higher average influent BOD, the Lagoons quickly become organically overloaded (BOD of 340 mg/L, overloads at flow between 6 & 7 MGD).

